REthinking and FOstering Competence and skills for sUstainable transport, Shipping, and logistics

REFOCUS

D2.2 – Implement and run the Communities of Practice (CoP)

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Executive Summary

"*We all know something.*

We all ignore something.

That's why we always learn."

Paulo Freire

REFOCUS (REthinking and FOstering Competence and skills for sUstainable transport, Shipping, and logistics) is an ERASMUS + project (2023-2025) in higher education aimed at co-designing a future-oriented curriculum and innovative training material on sustainability and climate resilience for transport, shipping and logistics sectors. Through learning Communities of Practice (CoPs), REFOCUS aims to engage academia (learners and educators), companies and organisations (labour market) in an interactive co-design process. CoPs are spaces for researching, generating, and sharing practice-oriented knowledge among people who share a concern or passion about something they do and who learn how to do it better through the interaction in CoPs. Based on the gaps identified in existing educational programs and good practices in education and training, REFOCUS CoPs will explore the knowledge needs in the transport, shipping and logistics sectors and provide the basis for developing a sustainable educational and training program, as well as the mechanism to monitor and assess its performance.

REFOCUS is organised in 5 Work-Packages (WPs) following the different stages of a design-thinking process: Empathise & Define – WP2, Ideate and Prototype – WP3, Test – WP4 (WP1 and 5 relate to management and dissemination respectively). This deliverable represents the report from REFOCUS Task 2.1 on structuring the learning CoPs and aims to address how to develop and sustain CoPs in order to stimulate innovation and socio-economic development in the area of transport, shipping and logistics. It will be used to guide the following tasks, 2.2 and 2.3, which relate to the actual organisation and analysis of REFOCUS CoPs.

This report provides an implementation report of the 4 CoP organized in the 4 countries represented in the consortium (with lead local partners in brackets and CAMBIAMO/ANDAIRA supporting with a facilitation role in all of them), namely: CoP 1 in Spain (CAMBIAMO/ANDAIRA), CoP 2 in Belgium (UANTWERP), CoP 3 in Greece (UAEGEAN & ACG) and CoP 4 in the Netherlands (TU DELFT). Each of the 4 REFOCUS CoPs held three online meetings between April and July and all of them attended a final online transnational meeting in September.

The aim of the CoPs was stimulating the innovation and socio-economic development in the area of transport, shipping and logistics as part of the REFOCUS Erasmus+ project. In REFOCUS, CoPs engaged diverse actors including students from different age groups and education levels/stages, educators such as university teachers, organisations including business representatives, persons in charge of managing internships and climate change NGOs. The aim has been the creation of learning CoPs as transdisciplinary learning spaces, to co-create knowledge for the challenging climate change issues and address how these

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issues can be reflected into educational programs, based on current needs, best teaching practices and existing programs.

This report details the quantitative and qualitative outcomes of each CoP guidelines, and a synopsis of the common and particular insights of each country. After the whole CoP running process, these outcomes of all REFOCUS CoPs will feed into the future-oriented curriculum and innovative training material on sustainability and climate resilience for transport, shipping and logistics sectors.

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Definitions, Acronyms and Abbreviations

Acronym/Abbreviation	Description
CoP	Community of Practice
NGO	Non-Governmental Organisation
y.o.	years old
WPs	Work-packages
IT	Information Technology
ACG	American College of Greece

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1 Introduction

1.1 The REFOCUS project

REFOCUS (REthinking and FOstering Competence and skills for sUstainable transport, Shipping, and logistics) is an ERASMUS + project in higher education aimed at co-designing a future-oriented curriculum and innovative training material on sustainability and climate resilience for transport, shipping and logistics sectors. Through the application of an innovative, engaging design-thinking approach, REFOCUS aims to stimulate innovative learning and teaching practices, ensure inclusiveness and accessibility to education and training, and raise awareness about climate change among students from different backgrounds and disciplines. The consortium of REFOCUS includes 6 partners from 4 European countries: (1) University of the Aegean (project coordinator, Greece) (UAEGEAN), (2) University of Antwerp (Belgium) (UANTWERP), (3) The American College of Greece Research Center (Greece) (ACG), (4) CAMBIAMO SME-non-profit organisation (Spain) (CAMBIAMO), (5) Andaira cooperative company, (Spain) (ANDAIRA) (6) Delft University of Technology (The Netherlands) (TU DELFT).

REFOCUS is organised in 5 Work-Packages (WPs) following the different stages of a design-thinking process: Empathise & Define – WP2, Ideate and Prototype – WP3, Test – WP4 (WP1 and 5 relate to management and dissemination respectively). In particular, WP2 “Identification of Market Needs and Educational Gaps (Empathise & Define)” aims to:

- Engage educators, stakeholders and learners in an interactive co-design process.
- Develop a transdisciplinary learning space, as the learning Communities of Practice (CoP), where different educators from academic and real-life world create knowledge for the challenging climate change issues and address how these issues can be reflected into educational programs.
- Review the needs, best teaching practices, and existing programs.

Through the creation of learning CoPs, REFOCUS have connected with people in academia (learners and educators), companies and organisations (labour market), while sharing ideas, knowledge and experiences to understand existing needs. REFOCUS will ideate and co-design within the learning community the new curriculum aiming to cover contemporary issues (sustainability, resilience, digitalization, green operations) of the transport, shipping and logistics sectors.

The main tasks (T) and results (deliverables, D) of WP2 will be the following:

- **T2.1: Report on structuring the learning Communities of Practice (CoP)**. TASK LEADER: Cambiamo. OBJECTIVE: to report on how to develop and sustain CoPs in order to stimulate innovation and socio-economic development in the area of transport, shipping and logistics. To create an incubator to breed new ways of thinking and doing. To develop a detailed plan of activities - action items that will ensure the engagement of participants throughout the project. RESULT: D2.1: Report on structuring the learning Communities of Practice (CoP).
- **T2.2: Implement and run the Communities of Practice (CoP).** TASK LEADER:

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Andaira. OBJECTIVE: to implement, coordinate and monitor the various CoPs. To structure communities in all four partners' countries and thus covering different disciplinary/sectoral positions (e.g. climate change activists, economists, public sector representatives, policy makers, transportation planners, logistic service providers, etc.). To clarify roles, expectations and agendas aiming at establishing an arrangement designed to provoke debate and reflection among participants. RESULT: D2.2: Implement and run the Communities of Practice (CoP).

- **T2.3: Report on best teaching practices and needs, existing programs and co-designing the curriculum.** TASK LEADER: UAegean. OBJECTIVE: To identify and review the best teaching practices and needs and specify the methodology/process for co-designing the curriculum. To use the insights from previous tasks as a reference for other parties, such as educators, academic institutions that are interested on revising their curriculum by applying an innovative approach such as the one that REFOCUS will implement, as well as for reviewing existing teaching practices that are considered to be successful and student-centred. RESULT: D2.3: Report on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) and co-designing the curriculum.

Based on the gaps identified in existing educational programs and good practices in education and training, this WP will explore the knowledge needs in the transport, shipping and logistics sectors and provide the basis for developing a sustainable educational and training program, as well as the mechanism to monitor and assess its performance. The indicators that will be used to measure the quality of the project's results include both qualitative and quantitative indicators: meeting the specified deadlines and objectives, number of REFOCUS CoPs (at least 1 per country), number of stakeholders involved into the CoPs (at least 25), share of non-academic stakeholders involved in the CoPs (at least 50%), number of similar existing programs reviewed (at least 3).

1.2 Aim and structure of this deliverable

This deliverable represents the report from T2.2 on implementation and run of the CoPs. It will be used to guide the following WPs.

It is structured in 4 main sections including section 1 to introduce the REFOCUS project and WP2 tasks and objectives, section 2 to describe the implementation report – CoPs process, agendas, and participants of each country, section 3 to present the quantitative and qualitative outcomes, section 4 to synthesise the main conclusions and next steps.

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2 Implementation report

The CoPs in REFOCUS have the objective of connecting people (learners and educators), companies and organisations (labour market), and facilitating that ideas, knowledge and experiences are shared among them in order to understand the skills and competences required in the labour market in the adaptation to climate change. The report 2.1 develop a detailed plan of activities and structuring the learning Communities of Practice (CoP). This report included the establishment of the CoPs in each 4 countries represented in REFOCUS partner organisations, and are numbered as follows:

- **CoP 1, Spain: CAMBIAMO/ANDAIRA**
- **CoP 2, Belgium: UANTWERP**
- **CoP 3, Greece: UAEGEAN & ACG**
- **CoP 4, The Netherlands: TU DELFT**

CAMBIAMO and ANDAIRA acted as facilitators in all the CoPs, and local partners in each of them supported the organisation, e.g. inviting relevant stakeholders, communicating with participants, addressing translation needs during the CoPs; with the commitment to achieve equal representation between women and men.

In particular, REFOCUS CoPs bring together external stakeholders from different groups, aiming at achieving a 50% representation between women and men:

- **Students**, in particular covering 3 typologies:
    - 16-18 years old (y.o.), representing teenagers from high school level.
    - 18-22 y.o., who are currently studying courses.
    - 23-25 y.o., who have recently graduated.
- **Educators**: University professors/instructors
- **Organisations**, including:
    - Business representatives
    - Persons in charge of organising “real-life” work experiences for students
    - Climate change non-governmental organisations (NGOs)

Citizens and Public and private stakeholder groups are selected in order to ensure that their diverse perspectives are represented in the CoPs, including their different aspirations, needs and preferences.

Each of the 4 REFOCUS local CoPs consisted of 4 online sessions of about 1 hour duration that were held in the months of April, May, June, July and September 2023 respectively. Specifically:

- A first session:
    - Objective: cover the motivations and expectations from REFOCUS CoPs.
    - Dynamic: open discussion.

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- A second session:
    - Objective: develop focused contributions around the main topics from the first session.
    - Dynamic: a padlet (interactive board) with the main topics, the participants contribute with their opinion, information and arguments.
- A third session:
    - Objective: come up with a specific proposal of the future-oriented curriculum.
    - Dynamic: curriculum in draft form, the participants contribute with their ideas.
- A fourth session:
    - Objective: validate the conclusions from each CoP in a transnational CoP.
    - Dynamic: presentation of main findings from each CoP and open discussion.

Agendas

This section presents the agendas that have been developed in the 1st, 2nd, 3rd in each CoPs. At the end the agenda of the transnational CoP is included in which members of the CoPs from all countries participated.

Table 1 Agenda session # 1

Activity
Welcome to the REFOCUS CoPs | 5 min
Tour de table on motivation and expectations of participants from REFOCUS CoP | 10 min
Warm-up / Ice breaker (e.g., share a preferred object) | 10 min
Group arrangement | 5 min
Launch of key ideas, narrative of the CoP | 20 min ● POSSIBLE QUESTIONS: ● Potential incidence in teaching / your organisation - what can be changed (FOR TEACHERS/ORGANISATIONS) ● … (FOR STUDENTS) ● Good practices related to sustainability ● (Brainstorming about REFOCUS module)
Wrap-up | 5 min ● TOPICS FOR FUTURE CoPs
Closing remarks | 5 min

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Table 2 Agenda session # 2

Activity
Welcome to the REFOCUS Community of Practice #2 | 2 min
Sharing the main topics from CoP#1 (Padlet) | 8 min
Developing focused contributions on these topics (Padlet) | 30 min
Discussion on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) | 15 min
Wrap-up and next steps | 5 min

Table 3 Agenda session # 3

Activity
Welcome to the REFOCUS Community of Practice #3 | 2 min
Sharing the main outcomes from CoP#2 | 5 min
Developing specific proposal on future-oriented curriculum | 50 min
Wrap-up and next steps | 5 min

Table 4 Agenda Transnational CoP

Activity
Welcome and introduction to the REFOCUS Community of Practice #4 - tour de table| 2 min
Welcome and introduction to the REFOCUS Community of Practice #4 - tour de table| 5 min
Presentation and discussion of results per session 1-2-3: Part 2 | 45 min (in plenary or in breakout groups)
Validation of oriented curriculum and next steps | 5 min

Below, we are detailing each of the 4 CoPs, including participants, and their profiles - stakeholder target and gender- and agenda -calendar and structure- of each CoP.

MADRID CoP 1_ Implementation report

Description

Meeting organiser: CAMBIAMO/ANDAIRA

Moderator: ANDAIRA

Note taker: CAMBIAMO

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Calendar

Table 5 Calendar Madrid CoP

1st session	2nd session	3rd session
08 May 2023 16:00-17:00	29 May 2023 17:00-18:00	28 June 2023 16:00-17:00

Participants

Table 6 Participants Madrid CoP

#	Stakeholder	Stakeholder Target
1	Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM	Educator
2	Project Manager AUVASA bus operator	Organisation Transport Operator esentative
3	Remote Sensing & GIS Specialist.	Educator
4	Representing the Spanish ecofeminist network	Organisation NGO
5	High school Student	Student 16-18 y.o.
6	High school Student	Student 16-18 y.o.
7	Moderator 1 Andaira	
8	Moderator 2 CambiaMO	
9	Moderator 3 CambiaMO	

UANTWERP CoP 2_ Implementation report

Description

Meeting organiser: UANTWERP /CAMBIAMO/ANDAIRA

Moderator: CAMBIAMO

Note taker: ANDAIRA

Calendar

Table 7 Agenda UAntwerp CoP

1st session	2nd session	3rd session
19 April 2023 16:00-17:00	17 May 2023 16:00-17:00	28 June 2023 16:00-17:00

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Participants

Table 8 Participants session #1 UAntwerp CoP

#	Stakeholder	Target stakeholders
1	Professor from the University of Antwerp_ Department of Transport and Regional Economics	Educator
2	Researcher from the University of Antwerp_ Department of Transport and Regional Economics	Educator
3	Professor the University of Antwerp _ Transport and regional economics	Educator
4	Student 18-22 y.o _ University of Antwerp	Student 18-22 y.o
5	High school Student 16-18 y.o	Student 16-18 y.o
6	Advisor Mobility and Logistic	Organisation Business representative
7	Post-Doctoral Researcher from the University of Antwerp	Student 22-25 y.o
8	Student 18-22 y.o University of Antwerp	Student 16-18 y.o
9	NGO	Organisation
10	Moderator 1 CambiaMO	
11	Moderator 2 CambiaMO	
12	Moderator 3 Andaira	

UAEGEAN & ACG CoP 3_Implementation report

Description

Meeting organiser: AEGEAN/CAMBIAMO/ANDAIRA

Moderator: CAMBIAMO

Note taker: ANDAIRA

Calendar

Table 9 Agenda UAegean & ACG CoP

1st session	2nd session	3rd session
10 May 2023 17:00-18:00 (EEST)	31 May 2023 17:00-18:00 (EEST)	26 June 2023 16:30-17:30 (EEST)

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Participants

Table 10 Participants UAegean & ACG CoP

#	Stakeholder	Target stakeholders
1	Professor from the American Collage of Greece_ Maritime, Transport and Logistics	Educator
2	Professor from the American Collage of Greece_ Information Technology (IT)	Educator
3	Professor from University of the Aegean_Department of Shipping, Trade and Transport	Educator
4	Postdoctoral Researcher from University of the Aegean_Department of Shipping, Trade and Transport PhD in City Logistics	Educator
5	PhD Candidate from University of the Aegean_Transportation and Logistics	Educator
6	Maritime ,shipping export consultant	Organisation Business representative
7	Project manager in transportation & infrastructure_IBI Group	Organisation Business representative
8	Maritime Manager Helmepa	Organisation NGO
9	Assistant professor from the American College of Greece_ transportation/maritime economy	Educator Organisation Business representative
10	Transportation Planner European_Comission	Organisation European organisation
11	Graduate_student_Shipping_Managment	Student 18-22 y.o
12	Postgraduate in management	Student 22-25 y.o

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13	Moderator 1 CambiaMO	
14	Moderator 2 CambiaMO	
15	Moderator 3 Andaira	

TU DELFT CoP 4_Implementation report

Description

Meeting organiser:TU DELFT/CAMBIAMO

Moderator: CAMBIAMO

Calendar

Table 11Calendar TU Delft CoP

1st session	2nd session	3rd session
16 june 2023 14:00-15:00 (EEST)	27 June 2023 16:00-17:00 (EEST)	18 July 2023 13:30-14:30 (EEST)

Participants

Table 12 Participants TU Delft CoP

#	Stakeholder	Target stakeholders
1	Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Educator
2	Professor from Delft University of Technology_ Maritime operations and managements	Educator
3	Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 18-22 y.o
4	Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 22-25 y.o
5	Moderator 1 CambiaMO	
6	Moderator 2 CambiaMO	
7	Moderator 3 Andaira	

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TRANSNATIONAL CoP

1. Description

Meeting organiser: CAMBIAMO/ANDAIRA

Moderator: CAMBIAMO

Note taker: ANDAIRA

4th session
20 September 2023 16:00-17:00

2. Participants

Table 13 session #4 Transnational CoP

#	Stakeholder	CoP
1	Project Manager AUVASA bus operator	1
2	Professor from the University of Antwerp_ Department of Transport and Regional Economics	2
3	Researcher from the University of Antwerp_ Department of Transport and Regional Economics	2
4	Graduate student from the University of Antwerp	2
5	Doctoral Researcher	2
6	Professor from the University of Antwerp_ Faculty of Transport and Regional economics	2
7	Professor from American College of Greece_ Maritime, Transport and Logistics	3
8	Professor from University of AEGAN Department of Shipping, Trade and Transport	3
9	PhD Candidate from University of the Aegean_Transportation and Logistics	3
10	Maritime ,shipping export consultant	3
11	Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	4
12	Professor from Delft University of Technology_ Maritime operations and managements	4
13	(Moderator 1) CambiaMO	
14	(Moderator 2) CambiaMO	

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15	(Moderator 3) Andaira
16	(Moderator 4) Andaira

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3 Outcomes

Quantitative outcomes

The table below provides an outline of the participants at the different local CoPs, including a gender analysis and the percentage of attendance in the different CoP sessions.

Table 14 Stakeholders participating in REFOCUS CoPs

	REFOCUS CoPs			
Details	**Spain**	**Belgium**	**Greece**	**The Netherlands**
Number of participants (gender distribution)	9 (100% female)	9 (22% female, 78% male)	12 (58% female, 42% male)	4 (100% male)
Types of stakeholders				
Educator	17%	33%	50%	50%
Organisation_Business representative	33%	11%	17%	-
Organisation_European	-	-	8%	-
Organisation_NGO	17%	11%	8%	-
Student 16-18 y.o	33%	22%	-	-
Student 18-22 y.o	-	11%	8%	25%
Student 22-25 y.o	-	11%	8%	25%
Participation				
In one session	50%	11%	42%	25%
In two sessions	50%	33%	33%	75%
In three sessions	-	56%	25%	-

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Qualitative outcomes

Below, a summary of each session and the main results of each of the CoP are presented.

Further down, a synopsis is presented to facilitate the comparison of the insights of each CoP distributed in common and particular insights.

Insights from session 1

MADRID CoP_Insights #1

The first session presents the Erasmus+ project called REFOCUS and explains the methodology of Communities of Practice (CoPs). These are virtual meetings with different profiles involved in the fight against climate change and sustainability in transport, logistics and shipping.

At the meeting, several participants express their expectations and interests in the CoP. The coordinator of the ecofeminist network highlights the importance of ecofeminism in the climate change debate and how to change perceptions about the use of private vehicles as a status symbol. Students bring a more youthful and practical perspective, focusing on recycling habits and their awareness of the environment thanks to social networks and communication channels.

Different experts in the field of climate change, discuss the need for more sensitive profiles and commitment of public and private organizations to comply with environmental regulations and promote sustainability.

The Ecofeminist Coordinator highlights the importance of changing the focus towards a profit instead of a renunciation in sustainable mobility issues and highlights the lack of ethical and social focus in training programs, especially in engineering and natural sciences.

It mentions the lack of political will in some public administrations to implement sustainable changes, despite having the capacity to do so. It discusses how to introduce a change of mentality in training and how new technologies can be used in the fight against climate change.

It concludes by emphasizing the need for more holistic and strategic approaches, as well as the importance of being a driver of change in administrations to achieve a significant impact in the fight against climate change. The importance of including a social perspective in technical matters and awareness of the role of new technologies in this area is also highlighted.

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UANTWERP CoP_Insights #1

The participants of the CoPs engaged in a fruitful discussion centred around sustainable transportation and its impact on climate change. They acknowledged the transportation sector's significant contribution to greenhouse gas emissions, underscoring the urgency for collective action and awareness. The group's diversity, comprising professors, students, practitioners, and researchers, was valued as it offered a range of perspectives on the topic.

The main objectives of the CoPs were to understand the scientific aspects of climate change, devise strategies to combat it, and explore the role of universities and courses in promoting sustainability. Notably, the students expressed their desire for courses that go beyond technical knowledge and emphasize cultivating a sustainability mindset to make a positive impact in their future careers.

The participants highlighted the challenges of innovating within the constraints of existing infrastructure, some of which had historical precedents set by civilizations like the Romans. They stressed the need for future-proof innovations that can adapt to changing circumstances over time. Additionally, addressing climate change was recognized as a social endeavour requiring the involvement of all stakeholders, including international entities. The importance of motivating behavioural changes and creating awareness among people was emphasized to collectively combat climate change.

The group explored the potential of pricing mechanisms to incentivize sustainable choices in transportation. However, they also acknowledged that implementing such mechanisms would require political will and careful consideration of social issues related to mobility and transport.

A key insight from this session was the significance of adopting a holistic approach in tackling climate change. This involved considering factors like spatial planning, taxation, and transport policies, and the need for interdisciplinary collaboration to address the complexities of sustainable transportation effectively. The participants advocated for the revival of a generalist approach to problem-solving to tackle climate change comprehensively.

UAEGEAN & ACG CoP_ Insights #1

The participants remark on the growing need for young professionals to engage with social media and digital products while also demonstrating expertise in addressing climate change concerns. Additionally, there is a demand for individuals who possess both technical skills and managerial capabilities. However, there is a notable lack of interpersonal and ethical-driven skills, particularly in the Greek market. Job positions related to ESG factors require the ability to envision and define sustainable design.

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While professors actively engage in research and incorporate sustainability aspects into certain courses, there remains a need to increase students' awareness and understanding of sustainability goals and ESG principles.

From the student perspective, a desire for more emphasis on sustainability and digital transformation in their courses was expressed, particularly in MBA programs. Students are becoming increasingly aware of environmental concepts and approaches, thanks to the efforts of their colleagues and the introduction of finance and environmental technology in their curriculum.

A key insight from this session regards the maritime industry: the shipping industry in Greece is being driven by market forces and legislation to prioritize ESG principles, positioning them as early adopters in the country. The industry is working towards raising awareness and protecting the seas.

TU DELFT CoP_ Insights #1

The first session in Delft emphasized the significance of incorporating sustainability in engineering education. Students expressed a strong desire to learn about sustainability and its application in their future careers, recognizing the importance of addressing environmental and climate change impacts in their respective industries.

Participants acknowledged their role in promoting sustainability within the private sector. By being proactive and advocating for sustainability solutions, students can drive positive change in their future workplaces, even if companies may not yet actively seek sustainability-related skills.

Ethical considerations were highlighted as crucial in engineering and sustainability. Students were exposed to courses exploring the ethical implications of technologies, emphasizing the responsibility to prioritize safety and societal well-being in engineering practices.

Regulation and financial incentives were recognized as essential drivers of sustainability efforts. Effective regulations can create financial motivations for companies to adopt sustainable alternatives, leading to increased investment in eco-friendly technologies.

Collaboration among diverse stakeholders was emphasized as necessary for addressing sustainability challenges effectively. By sharing knowledge and perspectives, participants recognized that innovative solutions to environmental issues can be collectively found.

The importance of addressing behavioural aspects in achieving sustainability goals was also recognized. Participants emphasized the need to promote sustainable practices and change consumption patterns alongside technological advancements.

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The Netherlands' unique coastal position was acknowledged, necessitating the adaptation and embrace of sustainable practices in the maritime industry to maintain a leading position.

Insights from session 2

MADRID CoP_Insights #2

In the second session of the CoP REFOCUS, the participation of different profiles was welcomed and appreciated. Topics identified in the first session were presented, including: Changes and more structural strategies, overcoming small modifications; Changes of mentality towards a more social and ecofeminist perspective; Roles of public and private actors in promoting sustainability. Padlet[1] was used for participants to reflect and develop ideas individually for 10 minutes.

Some proposals presented were the following:

In relation to structural changes and strategies, the students suggested measures to make recycling more accessible and reduce the use of plastic wrapping in packaged products. They also proposed a packaging return system with monetary rewards.

Representatives of the University and the labour market emphasized the importance of legislative changes and the role of civil society and NGOs in lobbying governments on sustainable issues.

Regarding the change of mentality, the engineering expert suggested disseminating good business practices, highlighting the prestige of those companies that promote family reconciliation and respect for the environment. From the side of the students, they proposed that the talks and trainings focus on real examples and highlight the benefits more than the obligations.

The social and ecofeminist perspective was also discussed. The students showed interest in learning more about this perspective, which was also shared by other participants. The coordinator of the ecofeminist network explained that this perspective considers environmental impacts from a gender perspective and promotes empathy and reconnection with nature.

It was mentioned that in job interviews, gaps in knowledge and sensitivity to apply the gender perspective in projects have been identified, which led to the proposal to incorporate this

[1] In this session we used the padlet as a support tool in the discussion. Specifically, the padlet is an online board that allows to create content individually or collaboratively. This tool was used in the 2sd CoP for participants to make comments on the board individually on the main issues that had emerged in the first session. These comments were identified by colors representing the following profiles: University, civil society, labor market and tools & methods. After having worked individually the comments were shared in plenary. This board was left open for participants to complete

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perspective in engineering courses. The development of ecofeminist indicators and their application in projects was also suggested as a theme for the next CoP.

In general, the University was highlighted as a fundamental actor to promote structural changes, providing continuous training for both professionals in the labour market and the public. The importance of taxation and free and quality public transport to ensure inclusion and equity was highlighted.

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Image *1* *Padlet* *Madrid* *CoP*

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UANTWERP CoP_Insights #2

During this session, the focus shifted to the Erasmus Plus project on higher education and the development of a sustainability course for the port sector. The participants continued to discuss the importance of a holistic approach to technological innovations. They emphasized the economic justification of innovations to promote sustainability without relying on subsidies. Integrating various sustainability-related courses into a single program was suggested to provide students with a broader perspective and understanding of interconnected disciplines.

Mindset change was identified as a significant factor in addressing climate change. Participants recognized the challenges involved in changing mindsets, particularly regarding climate change issues. The group agreed that providing neutral information and experiences, such as guest lectures and practical activities, could empower students to make informed decisions and develop a sustainability mindset.

The ethical implications of technological innovations, especially related to AI, were discussed. Participants stressed the need for a legal framework to ensure responsible and accountable AI use, including ethical considerations.

The group also considered the importance of preparing students for real-world challenges beyond the classroom. Incorporating survival skills and practical training in areas like ports, transportation, goods, and logistics was suggested to better equip students for their future careers.

Educators' role was highlighted as providing impartial and up-to-date knowledge, promoting critical thinking, and empowering students to make independent decisions rather than imposing beliefs or ideologies.

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Image 2 Padlet UAntwerp CoP

UAGEAN & ACG CoP_Insights #2

Consensus about prioritising Environmental Social Governance (ESG) factors was highlighted as crucial for a sustainable future. Governments and individuals must actively participate in environmental stewardship and governance.

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Additionally, integration is a central concept in promoting sustainability, and the private sector plays a role in assessing sustainability measures. Environmental concerns, such as unpredictable weather patterns and greenhouse gas emissions, are prevalent worldwide. To address these challenges, engagement and collaboration among people are necessary.

From educators; they consider introducing courses on legislation and regulation, focusing on sustainability goals, is essential in both management and engineering schools. Local regulations should align with international legislation, and key topics related to international sustainability should be integrated into existing courses across relevant areas.

The participants identify a significant mismatch between the ambition of sustainability-driven workers and the current demands of the labour market. From stakeholders' business targets, they suggest creating more jobs with a specific focus on sustainability requirements. They can leverage the skills and abilities of their existing resources by providing ongoing training and skill enhancement.

Additionally, they identify a lack of awareness and understanding of what sustainability truly means. From stakeholders' business targets, they suggest that the universities should organise seminars or workshops to inform the labour market about sustainability innovation and solutions.

Image 3 Padlet UAEgean & ECG CoP

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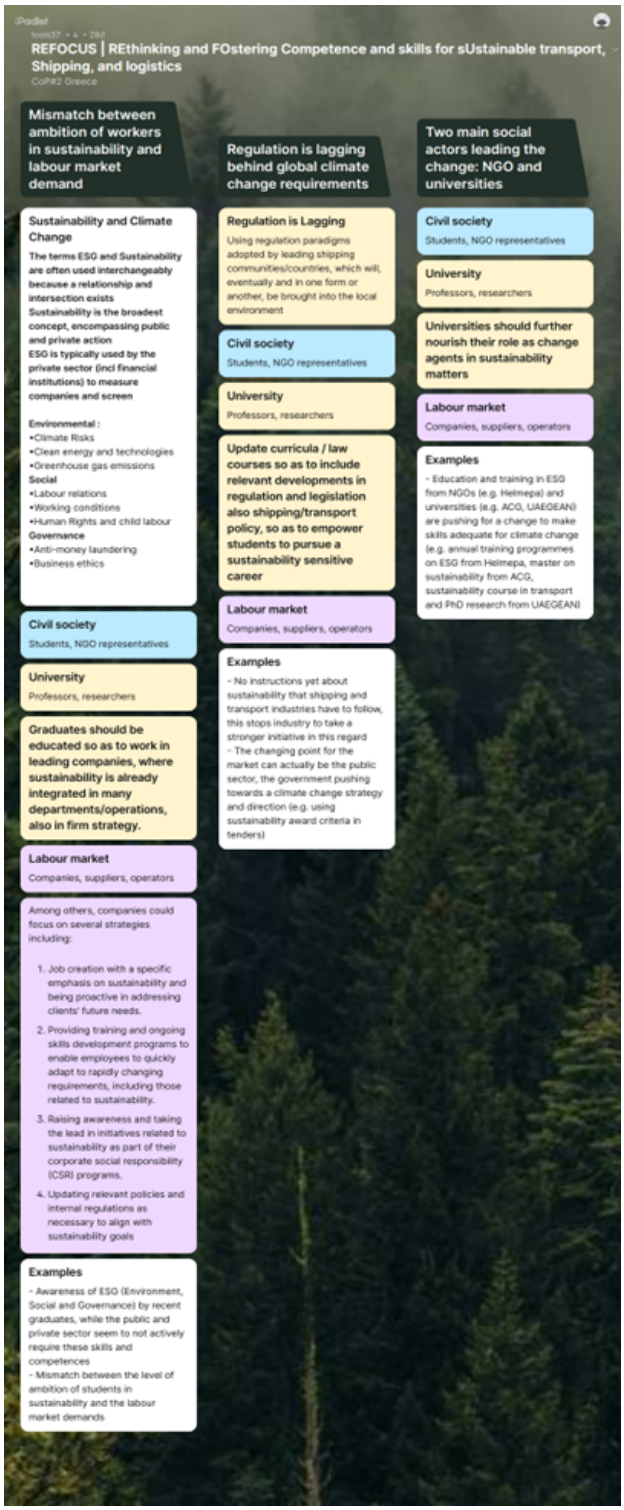

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TU DELFT CoP_Insights #2

During the second session in Delft, participants highlighted the significance of further integrating sustainability into engineering education and practices. There was enthusiasm among students to develop technological solutions for sustainability, but concerns were raised about sustaining this enthusiasm if companies do not actively support or engage in sustainability practices.

The importance of companies acknowledging sustainability was emphasized, and the idea of introducing sustainability concepts to foster meaningful change was discussed. Participants explored the contributions of civil society, universities, and the labour market, encouraging new ideas and perspectives.

The discussion revealed insights on the challenges of transitioning towards sustainable solutions and the need to consider external costs beyond immediate financial implications. Sustainability should be quantifiable and visible in engineering designs, and students should be made aware of the broader context of climate change when making decisions.

Collaboration in engineering was considered essential, recognizing that diverse perspectives, interdisciplinary involvement, and global inclusivity are vital for fostering innovation and creating inclusive designs.

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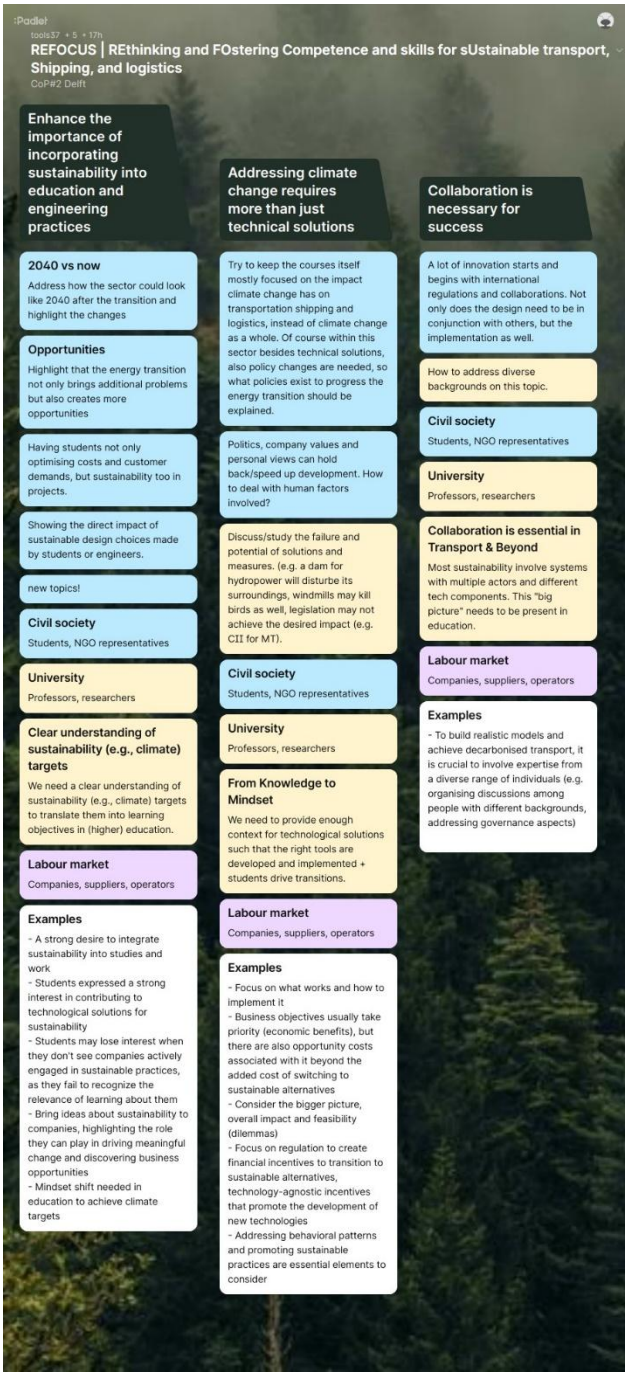
Image 4 Padlet TU Delft CoP



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Insights from Session 3

MADRID CoP_Insights #3

In this session of the community of practice (CoP) in Madrid, the objective of co-designing a curriculum for engineering related to transport and logistics, with a focus on sustainability and green operations. It was mentioned that this would be the last CoP in Madrid and that an international meeting with other CoPs in Greece, Antwerp and Delft would be held in September.

In the discussion, different aspects of the curriculum were addressed, including the target audience, the possibility of integrating impact evaluation and the importance of addressing the gender perspective and the collective vision in engineering. Participatory and co-creation methodologies were also mentioned as part of the curriculum.

It was proposed that the course would be more focused on master's students due to the complexity of the concepts covered. The possibility of including experiences of connection with nature, such as "baños de bosque" in nature and observing the effects of climate change, as well as experiences of sustainable transport and appreciation of the landscape, was raised.

It was suggested that the curriculum could include modules related to technology, legislation and regulations, life cycle analysis applied to mobility, as well as the introduction of the ethical and collective perspective in project planning.

Participants considered that the collaborative and participatory approach was essential in the design of the curriculum, involving end users and working together with them to improve the sustainability of the projects. The importance of innovating in the way these subjects are taught and of including good practices from the business world was highlighted. Co-design experiences with users themselves were also highlighted to test before launching the final product/services and thus be more efficient and include the perspective of users.

A duration of 10 face-to-face hours was agreed with 10 to 15 hours of student work, or 15 face-to-face hours and 5 hours for each module, in addition to 15 to 20 hours for students to work on specific projects.

The importance of sharing experiences in expert seminars was mentioned and it was proposed to collaborate on the content of these modules, such as participatory methodologies and ecofeminism.

In conclusion, the CoP showed its enthusiasm and appreciation for the opportunity to participate and highlighted the importance of integrating sustainability and collective vision into

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the transport and logistics engineering curriculum. It is planned to share the results with other CoPs at a transnational meeting in September.

Table 15 Future-oriented Madrid CoP

TITLE	**Curriculum on sustainability and climate resilience for transport, shipping and logistics**
OBJECTIVE	Provide a comprehensive understanding of the skills required by the market or NGOs, going beyond what universities typically offer. The aim is to propose concrete content that addresses sustainability and climate change awareness in the areas of transport, shipping, and logistics.
TYPE	In the next section
DURATION	10 face-to-face hours with 10 and 15 hours of student work. Another proposal is 15 face-to-face hours and 5 hours for each module and another 15-20 hours in which students will occupy and work on the projects they have to carry out.
TARGET	Focused on master's students In the degree courses brief introduction to impact evaluation
DESCRIPTION	Aspects to be covered during the training: (Topics collected in the previous sessions) ● Introduce the gender perspective, gender analysis in studies and designs in engineering. ● Introduction to ecofeminism in engineering. Ecofeminist indicators, ways of applying them to projects ● Introduction of a social perspective ● Introduction to the circular economy Proposals in this session ● Ethics, more collective and less individualistic perspective, think about projects from this approach

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	• Knowledge about the demands and requirements of mobility and public transport projects that administrations are asking for. • Introduce the story of earnings versus resignations. • Include lifecycle analysis applied to mobility.
METHODS	More immersive learning experiences: • "Baños de paisaje" (methodology) • Field visits where the impact of climate change is observed. • Urban audits • Role play; understand the perspective of the different actors involved in the ecosystem and how they impact them Encourage teamwork among engineering students (usually very individualistic) Practical mobility project Seminars with experts to deal with very specific topics.

UANTWERP CoP_Insights #3

In the third session, the participants focused on the development of a sustainability course for the port sector as part of the Erasmus Plus project. The group highlighted the significance of economic justification for innovations to ensure efficient resource allocation and sustainability without relying on subsidies. Integrating various courses addressing sustainability into the program was emphasized to provide students with a comprehensive understanding of interconnected disciplines.

Mindset change remained a central theme, with the recognition of the challenges involved in shifting mindsets, particularly in relation to climate change. Providing neutral information and experiences, such as guest lectures and practical activities, was seen as essential to empower students to make informed decisions and cultivate a sustainability mindset.

Ethical considerations in technological innovations, particularly related to AI, were once again discussed. Participants emphasized the need for a legal framework to ensure responsible and ethical use and approach.

Involving students in practical initiatives, such as evaluating best practices and centralizing sector-related sustainability initiatives, was also considered to enhance students' engagement and understanding of sustainability challenges.

The preferred teaching method for short courses was identified as in-person, with master students being the core target audience.

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The triple bottom line concept was acknowledged as crucial, emphasizing the balance between people, planet, and profits for sustainable development. Integrating sustainability into the curriculum from the bachelor level and reinforcing it through repetition was suggested to create a sustainable trajectory in education.

Participatory methodologies, like the use of a *"port endeavour game",* were proposed to promote collective decision-making and consider diverse viewpoints in the course.

The CoP emphasized the need to consider ethical aspects and human rights when developing courses. While human rights issues may not be the central focus of the port course, raising awareness among future managers about treating people with respect and fairness was deemed essential.

Table 16 Future-oriented Curriculum UAntwerp CoP

TITLE	**Future-oriented curriculum on Sustainability, Ethics, and Human Rights**
OBJECTIVE	Propose improvements for existing courses or suggest new courses related to sustainability, ethics, and human rights
TYPE	In-person short course, mostly
DURATION	Discussion about whether the 16 hours should be taught in one week or spread over a longer period.
TARGET	University students, particularly at the master's level, are identified as the core target audience
DESCRIPTION	The course aims to complement existing courses by focusing on sustainability, ethics, and human rights in the port sector. It will integrate practical experiences, guest speakers, and assignments to centralize initiatives from the sector. The course will emphasize the triple bottom line approach (people, planet, profit) and adhere to the UN's definition of sustainability. It will also explore the legal framework, good practices, and the translation of sustainability into practice within organizations.
THEMATIC UNITS	May include topics such as sustainability in port operations, climate resilience, legal frameworks and regulations, good practices and case studies, ethical considerations, human rights. Identifying best practices
METHODS	Participatory methodologies will be employed, including lectures, guest speakers, practical experiences (e.g., field trips), assignments, and the use of a port endeavor game to foster collective decision-making and consider diverse viewpoints.

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UAEGEAN & ACG CoP_Insights #3

The discussions revolved around the importance of incorporating sustainability into the course syllabus, specifically in relation to legislation and regulation, the true meaning of sustainability, and social aspects.

Participants emphasised the need for a common understanding of sustainability's multiple dimensions, including environment, economy, and ethics. The suggestion of in-person courses was made to provide more interactive experiences for students. The timings of introducing the course in the third year was recommended to build on foundational Knowledge. Develop a solid knowledge base and establish a new approach for sustainability implementation.

Starting sustainability education at an early age was also considered valuable. Practical knowledge and involvement of industry practitioners were suggested for a more comprehensive understanding. Learning from the past successful practices and incorporating sustainability aspects into existing courses were proposed as options. The challenges and importance of addressing social aspects of sustainability, such as incorporate social responsibility, were emphasised, with the recognition that the area requires ongoing development and attention. Specifically, recommendation to develop a sustainability approach in finance courses to proactively implement sustainability principles, governance, technologies, and other measures in their operations.

Teaching the same course in a naval engineering department and a shipping management department would require different levels of detail and focus.

Additionally, incorporating sustainability projects and workshops into the curriculum was seen as a beneficial way for students to engage with sustainability concepts and develop innovative ideas and solutions.

Table 17 Future-oriented Curriculum UAEgean & ACG CoP

TITLE	**Future-oriented curriculum on sustainability and climate resilience for transport, shipping and logistics**
OBJECTIVE	Provide a comprehensive understanding of the skills required by the market or NGOs, going beyond what universities typically offer. The aim is to propose concrete content that addresses sustainability and climate change awareness in the areas of transport, shipping, and logistics.
TYPE	It can be inferred that there is a preference for in-person courses due to their interactive nature and potential for better engagement.
DURATION	A suggestion is made for a standalone course titled "Sustainability and Climate Resilience for Transport, Shipping, and Logistics" consisting of 13 modules. The specific number of

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	hours is not mentioned, but it is suggested that the course could be introduced in the third year of study.
TARGET	The target audience for the course includes students of business administration and shipping administration, as well as professionals in the transport, shipping, and logistics sectors.
DESCRIPTION	Main aspects to cover: ● Awareness and understanding of the comprehensive meaning of sustainability, including its environmental, economic, and social/ethical dimensions. ● Social issues, including labor relationships, working conditions, and human rights. ● Legal and policy matters, including legislation and regulation, particularly those related to climate and sustainability goals.
THEMATIC UNITS	1. Environmental Social Governance (ESG) factors for a sustainable future . Governments and individuals must actively participate in environmental stewardship and governance. . Integration as a central concept in promoting sustainability. . The private sector's role in assessing sustainability measures, addressing environmental concerns, and fostering engagement and collaboration. . Legislation and regulation focusing on sustainability goals. . Integration of key sustainability topics into existing courses in management and engineering schools, ensuring alignment with local and international regulations.
METHODS	To enhance knowledge on sustainability and share good practices, involving NGO or private representatives, such as through campaigns, seminars, and lectures, can be beneficial. Organizing workshops and seminars would also facilitate learning and collaboration. Developing individual or group projects on sustainability would provide students with practical application and the opportunity to research and justify their ideas. This hands-on approach can deepen understanding and engagement with sustainability principles. In terms of fitting the proposed curriculum, it could be integrated into existing courses across various disciplines, depending on the specific focus and content. However, considering the comprehensive nature of sustainability, a standalone course dedicated to sustainability could also be considered to provide a more in-depth exploration of the subject.

TU DELFT CoP_Insights #3

In the third session, participants recognized the significance of collaborative methods and critical thinking in the design process, which can lead to innovative solutions.

The importance of integrating sustainability considerations into engineering education at both bachelor's and master's levels was emphasized. A progressive approach was suggested, starting with simple calculations and comparisons at the bachelor's level and moving towards more complex analyses at the master's level.

Interdisciplinary education for engineering students was considered valuable, allowing students to develop a holistic understanding of their technological decisions and their impacts on people and communities.

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Ongoing development and adaptation in engineering education were stressed. Engineering programs should stay up to date with emerging challenges and incorporate new knowledge and technologies to address current sustainability trends.

Real-world applications in engineering education were highlighted. Exploring practical cases and collaborating with industry partners can provide students with valuable experiences and insights into addressing sustainability issues in their fields.

Table 18 Future-oriented Curriculum TU Delft CoP

TITLE	Future-oriented curriculum on sustainability and climate resilience for transport, shipping and logistics
OBJECTIVE	Integrate interdisciplinary knowledge for climate-neutral waterborne transport and collaboration strategies, tailored for bachelor's and master's programs.
TYPE	*No outcomes*
DURATION	
TARGET	Bachelor's and master's students in maritime technology and mechanical engineering, with introductory content at the bachelor's level and more advanced topics (e.g.: analyzing specific use cases and performing logistical calculations) at the master's level. Minor study to explore a specific area of interest in greater depth, dedicating a portion of their credits to specialized courses. *By creating a minor focused on interdisciplinary aspects, students could have the opportunity to develop the necessary tools and skills to address sustainability and societal impacts within their field.*
DESCRIPTION	Main aspects to cover: 1. Highlighting opportunities of the energy transition, energy efficiency improvements leading to sustainability improvements 2. Quantifying impacts and balancing functionality (customer demands), efficiency, effectiveness 3. Understanding / anticipating existing and future policies and thinking ahead in the design process, handling complexity in policy implementation (Policy and legal framework) 4. Incorporating climate change knowledge and the concept of sustainability, embracing an interdisciplinary approach
THEMATIC UNITS	1. Highlighting opportunities of the energy transition, energy efficiency improvements leading to sustainability improvements Additional opportunities that come from switching to more energy-efficient systems, thinking about what those opportunities could be in the transportation and logistics sector. Calculations and use cases comparison (from mechanical systems (BSC) to logistics (MSC)). *Target: bachelor students, master students* 2. Quantifying impacts and balancing functionality (customer demands), efficiency, effectiveness Economic, environmental and societal impacts, not just about the immediate financial cost, but also considering the broader implications and externalities. Considering functionality (customer technical specifications), not just environmental costs, but also the regular operational costs and overall sustainability. Life-cycle assessment. Supply chain analysis.

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	Multi-criteria analysis. Applied in design projects. IPCC, IPBES reports. Using examples of past events (e.g. wrong choices leading to inequalities and other impacts). *Target: bachelor students, master students (quantified)* 3. Understanding / anticipating existing and future policies and thinking ahead in the design process, handling complexity in policy implementation (Policy and legal framework) Essential to have an understanding of existing and future policies and think ahead in the design process. Decision-making based on different scenarios and projections. *Target: master students* 4. Incorporating climate change knowledge and the concept of sustainability, embracing an interdisciplinary approach Understanding climate change and its mechanisms is typically covered in biology or related subjects. The field of sustainability is still evolving, and there is ongoing research and discussion surrounding it. Case studies. *Target: bachelor, master students (interdisciplinary project), PhD* Incorporating environmental considerations into the ship design
METHODS	Interdisciplinary courses: there are ongoing efforts to develop an interdisciplinary course in collaboration with Durham University of Applied Sciences and trade schools. The goal is to bring together different levels of education to solve maritime issues. Guest speakers (e.g.: invite representative from an NGO focused on ship recycling to provide insights into their work)

TRANSNATIONAL CoP

Insights from Session 4 – Transnational CoP:

In the transnational session, members from all CoPs were divided into two breakout rooms in order to discuss the main insights appreciated from previous meetings.

Participants broadly acknowledged great balance and accuracy in the insights discussed, emphasizing the importance of combining legal, economic and technological elements in order to address sustainability from a transdisciplinary viewpoint. In this sense, a holistic, methodical and systematic approach was again highlighted as essential.

Concerning the economic aspects, financial incentives were also stressed, emphasizing the need to take into consideration the implementation of negative financial incentives, such as fines. A deep scientific debate on both the importance and the difficulty of measuring external costs appeared and diverse perspectives on the way of politically approaching negative social and environmental impacts were brought to light.

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Participants also highlighted the significance of students being aware of the mentioned economic features in order to be able to understand sustainability issues. The change towards a constructive point of view and the need to make responsible decisions by students were highlighted.

In regard of the future-planned curriculum, deepening its technical aspects and identifying its target audience was emphasized. In this sense, participants also stressed the importance of orienting the curriculum towards non privileged young people, leaving no one behind.

Main feedback noted from each breakout room on the key insights appreciated from the three previous CoP sessions were the following:

Breakout room A feedback to the insights from session #1

- Both common and particular insights are balanced and quite in line with the topics discussed in CoPs.
- Remarking the importance of a holistic, methodical and systematic approach.
- Debating on financial incentives, laws and economically feasible businesses is important.
- Negative incentives, such as fines, are also another way of financial politics which is not captured in the insights.
- Some economic incentives could be related to free public transport.
- From Greek CoP; Particular Insight no.2 reflects a change towards a constructive perspective on the topic, which represents a different stage of evolution towards which the Greek context is transitioning.

Breakout room B feedback to the insights from session #1

- The ESG (Environmental Social Governance) principles are usually used in the investment sector. Since the context of our topic is completely different, we should use other kind of vocabulary.

Breakout room A feedback to the insights from session #2

- Demanded an explanation about the idea of including external costs measurements, leading to a deep scientific debate on the topic.
- Different views on the way of approaching external costs from a political perspective, emphasizing the need but also the difficulty to do so.
- There are also other ways to measure social and environmental impact of certain decisions apart from external costs.
- Rather than a deep academic debate, it reflects a fundamental economic argument about how not to internalize external costs, which is a viewpoint students should be aware of in order to understand sustainability issues.
- Students should take their own responsible decisions on the topic.

Breakout room B feedback to the insights from session #2

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- The particular insights reflect a good and necessary combination of economic, legal and technological solutions.

Breakout room A feedback to the insights from session #3

- As the curriculum is oriented towards technical subjects, the technical aspects that have been discussed throughout the CoPs should be more emphasized.
- Also, the target audience of the curriculum has not been identified (oriented to non-privileged young people).
- There is a great importance in not leaving anyone behind.

Breakout room B feedback to the insights from session #1

- The huge variety of local contexts from each CoP can be appreciated, specially from the Greek group, which had strongly different discussions.
- Some doubts are mentioned whether to put Legal framework and human rights at the center of the topic of sustainability, although most agree on its importance.
- Transdisciplinary approach is very important. The combination of legal, technological and economic aspects should be all addressed together from an integrated perspective.
- Future oriented curriculums are too specific, we should be more flexible in order to adapt to each country's own regulations.

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Insights synopsis

Table 19 Insights synopsis Please mention in the insights' sections above that there is a summary table below

Nº	Common insights	Particular insights
1st session	✓ Public and private organizations to comply with environmental regulations and promote sustainability. ✓ Adopting a holistic approach in tackling climate change. ✓ Social perspective in technical matters ✓ Students expressed a strong desire to learn about sustainability and its application in their future careers.	✓ The importance of ecofeminism in the climate change debate (Madrid CoP) ✓ Changing the focus towards a profit instead of a renunciation in sustainable mobility issues (Madrid CoP) ✓ Financial incentives to incentivize sustainable choices in transportation (UAntwerp CoP) (TU Delft CoP) ✓ Prioritize ESG principles in the shipping industry (UAEGEAN & ACG CoP) (TU Delft) to promote and maintain a leading position.
2nd session	✓ Holistic perspective ✓ Critical thinking in engineering studies ✓ The importance of the role of the university and of policies and legislations to apply the principles of sustainability in the private and public sector. ✓ Learning about how to measure environmental and societal impacts.	✓ The role of the university as a framework to renew and update the knowledge in sustainability of professionals who are already in the labor market. (Madrid CoP) (UAEGEAN & ACG CoP) ✓ Demonstrate the impact of external costs, and it is ultimately the students' responsibility to make informed decisions. (UAntwerp CoP) ✓ Neutral and objective learning (UAntwerp CoP) ✓ Introducing courses that focus on legal and policy matters, emphasized in engineering schools (UAEGEAN & ACG CoP)

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		✓ Technological solutions: Increase efficiency, which indirectly leads to using less energy, making it more sustainable (TU Delft) Collaboration with a variety of stakeholders to create the best solutions. (TU Delft)
3rd session	✓ Oriented to master's studies but introducing sustainability at the bachelor level. ✓ Immersive and participatory methodologies (field visits, guest speakers, seminars, practical knowledge) ✓ Social and ethical impact considerations	✓ Encourage teamwork in engineering studies (Madrid CoP) ✓ Gender perspective (Madrid CoP) ✓ Emphasize the triple bottom line approach (people, planet, profit) and adhere to the UN's definition of sustainability (UAntwerp CoP) ✓ Legal framework and human rights (UAntwerp CoP and UAEgean & ACG CoP) ✓ Transdisciplinary projects (TU Delft CoP)

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2. Conclusions and next steps

This report presents the implementation of REFOCUS CoPs in the 4 countries represented in the consortium (with lead local partners in brackets and CAMBIAMO/ANDAIRA supporting with a facilitation role in all of them), namely: CoP 1 in Spain (CAMBIAMO/ANDAIRA), CoP 2 in Belgium (UANTWERP), CoP 3 in Greece (UAEGEAN & ACG) and CoP 4 in the Netherlands (TU DELFT).

The short period of time of the implementation of these CoPs from May to June has been a challenge for this first phase of the project. In just three months, in April, May and June, the participants have been contacted and 3 sessions of each CoP have been held. The fourth transnational CoP has been held in September.

These limited deadlines have been solved by the good coordination and availability of the person/people in charge of the CoP of each country to contact the participants and organise the online meeting. It also highlights a high understanding of the objectives of the methodology of the Community of Practice and the effectiveness to coordinate by the CambiaMO and Andaira team.

The diversity of the profiles initially proposed has also been a challenge for this phase, despite not having reached exactly the proposed percentages of gender and stakeholder profiles, the composition of the CoP has worked correctly, combining the desired criteria of homogeneity and heterogeneity. The CoP methodology is not based on a criterion of statistical representativeness, but it focuses on a qualitative representation in terms of structural collection of discourses, approaches and experiences.

Despite having applied the same agendas and methodologies in all countries, each CoP has had a particular vocation, a distinctive character compared to the others. Due to the situational and territorial framework of each country and its industrial and technological context, different themes have been developed and prioritised in each CoP.

In the Madrid CoP, the ecofeminist approach for the analysis of the environmental and technological reality and the evaluation of socio-environmental impact was highlighted. They also underlined the importance of social approach in technological studies.

In the UAntwerp CoP, they focused on the importance developing technological innovation to improve sustainability in logistics and having an ethical and neutral approach in technological studies.

In the UAegean & ACG CoP, participants underlined the importance of applying ESG especially in the maritime industry to continue developing the industry based on principles of sustainability and leading position within the industry. Introducing courses that focus on legal and policy matters, as well as legislation and regulation in engineering careers were underlined as crucial.

In the TU Delft, promoting sustainability within the private sector and adaptation of sustainable practices in the maritime industry to maintain a leading position were emphasized. Ethical considerations were highlighted as crucial in engineering studies.

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The outcomes of all REFOCUS CoPs will feed into the future-oriented curriculum and innovative training material on sustainability and climate resilience for transport, shipping and logistics sectors.

Appendix

Minutes

This document contains the agendas, number and profiles of the participants, and contents of each session of the 4 participating countries.

The minutes collect the significant contents of the CoP sessions and identify the authors of each intervention with an acronym included in the table of participants.

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The materials co-created in sessions 2 and 3 of the CoPs are added.

How to read this document:

1. Each participant's verbatim interventions are in italics.
2. When there are summaries and conclusions (own interpretations) they are not in italics.
3. In bold are the ideas pointing out the most important ideas of the intervention.

Madrid CoP

Session n#1

Meeting organiser: CAMBIAMO/ANDAIRA

Moderator: ANDAIRA

Note taker: CAMBIAMO

1st session
08 May 2023
16:00-17:00

Table 20 Agenda_session #1 Madrid CoP

#	Hour	Activity

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1	17:00 - 17:05	**Welcome to the REFOCUS CoPs**
2	17:05 - 17:15	**Tour de table on motivation and expectations of participants from REFOCUS CoP**
3	17:15 - 17:25	**Warm-up / Ice breaker** (e.g., share an object)
4	17:25 - 17:30	**Group arrangement**
5	17:30 - 17:50	**Launch of key ideas, narrative of the CoP** ● POSSIBLE QUESTIONS: ● Potential incidence in teaching / your organisation - what can be changed (FOR TEACHERS/ORGANISATIONS) ● … (FOR STUDENTS) ● Good practices related to sustainability ● (Brainstorming about REFOCUS module)
6	17:50 - 17:55	**Wrap-up** ● TOPICS FOR FUTURE CoPs
7	17:55 - 18:00	**Closing remarks**

Table 21 Participants session #1 Madrid CoP

#	Stakeholder	Stakeholder Target
1	BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM	Educator
2	AM_Project Manager AUVASA bus operator	Organisation Transport Operator esentative
3	IG_Remote Sensing & GIS Specialist	Educator
4	DG_Representing the Spanish ecofeminist network	Organisation NGO
5	E_High school Student	Student 16-18 y.o.
6	E_High school Student	Student 16-18 y.o.
7	Moderator 1 Andaira	
8	Moderator 2 CambiaMO	
9	Moderator 3 CambiaMO	

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Welcome and introduction by Ester. We will send an informed consent for the recording. Analysis of the content without names and surnames, only indicating your profile.
A learning community is a virtual meeting to connect people of different profiles.

Warm-up:

Round of presentations (name, in which you are working), choosing an object that represents you from another dimension, more emotional:

(1) BM_ research and transport centre; Professor at UPM, degree in Forest Engineering and Forestry Engineering, and in the degree of Environmental Engineering. Research on sustainable transport.

2-3) 2 students: Baccalaureate biological sciences Elisa and Alicia, 17 years old.

4) Agronomist, worker of AUVASA, operator of urban buses of Valladolid. Project management. Experience in gardening classes. Mug of beatles as pencil holders.

5) IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop. Universidad Politécnica de Madrid_Isabel: Agresta, cooperative of La Traviesa - forestry consultancy. Forest engineer, specialized in remote sensing to observe changes in the use of the territory and forest masses. German spices added to mulled wine at Christmas.

6) Ecofeminism Network Coordinator. Technical forestry engineer works on energy issues. Cooperative las Gallas that works in the energy sector and ecofeminism, coordinates the network.

7) Ester: sociology and anthropology, dry lichen indicator of forest ecosystems

8) Floridea

9) Maria

Presentation program Erasmus + project:

Presentation of the Erasmus + REFOCUS project. Definition of CoPs: as virtual meetings with instincts profiles: Profile university professor, business, real life, and students, as a meeting point to see motivation and needs of each party, as what profiles are required in the fight against climate change, how students are forming. There are no answers that are right or wrong.

Moderator 1

- *What are your expectations and interests by participating in this learning community, CoP, on climate change?*

DG_Representing the Spanish ecofeminist network

- *A very current issue, as people have **to change so that the private vehicle is not a status symbol**. **Ecofeminism** are views that have much to contribute to this debate.*

E_High school Student& A_student

- *We have to contribute a more **youthful, more practical point,** even knowing less theory but more about how it affects us daily. Recycling habits, we try to contribute.*

IG_Remote Sensing & GIS Specialist

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- *We have a large **database that allows us to see how cities and forests have evolved**. We observe a decay due to CC, detecting in advance we can take measures, see how different areas have grown, where the green part must be increased to compensate for the effects of CC.*

BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM.

- *I can contribute from the profile of research in transport, my vision on research in sustainable mobility. Vocation in sustainability, but **I see barriers in social issues that are very difficult to fit,** often research is framed in social sciences and does not fit or interest in natural sciences, it is very difficult to talk about feminism or ecofeminism and be understood.*

AM_Project Manager AUVASA bus operator

- *Very interesting perspectives, I see the **gender difference in the use of transport**. Projects that promote public transport, cycling or mobility on foot. Our main users are **women, who are more prepared for sustainable mobility**. They are the ones that best adapt. Thinking about feminism and adaptation to CC, my grandmother was able to recycle everything that was generated, **circular economy**. But I am happy to see the young Elisa and Alicia who have more awareness than my generation. I have given environmental awareness courses and now that barrier is more passed.*

E_High school Student& A_student

- *With social networks, and communication channels, we are **more aware of recycling and the consequences of our habits on the environment**. We are more aware, even of small acts.*

Moderator 1

- *What profiles are you demanding in AUVASA?*

AM_Project Manager AUVASA bus operator

- *It is a public company, everything public has an easier environmental approach. It has more capacity to decide in order to comply with regulations. These profiles are more necessary, for example, in European projects it is required that they are not harmful to the environment. **The administration asks you for many more answers in the face of environmental sustainability, there is a greater demand**. Sensitive and compliant profiles, with real commitment.*

DG_Representing the Spanish ecofeminist network

- *There is no longer so much denialism. There is a lot of **greenwashing**, but we must ask ourselves if we can overcome the anthropocentrism we live, if **we settle for gradually changing habits or being braver**. Are we telling the reality? It depends on the situation. I'm already bored with these small changes of planting four trees and thinking that this is going to save us. We must think about these aspects **when proposing a project or activity, where we want to go**. Because it's no longer worth anything.*

Moderator2

- *What should we do? To build highways, make airports... that we would have to put in the program so that it is not boring...*

DG_Representing the Spanish ecofeminist network

- ***Changing the focus, which is not a renunciation, is a gain,** that it is not a problem not to have to take the car, to be able to bathe in clean waters ... that it is not a renunciation not to go by plane to a city thousands of miles away. We cannot return to the past, there are new dangers. **It is central that we***

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***understand that we can be happier with more quality of life**. As long as it is not understood, a large part of society will not listen, it is blind because it sees it as a loss.*

Moderator 1

- *How can we introduce this change of mentality into training?*

BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM.

- *I have the feeling that we talk to each other, we agree, I don't know how to break that barrier. Small steps we can continue to give them, but they no longer work. **Do not base our economy on consumption alone, if we want our species to survive**.*

Moderator 1

- *More social approach in engineering?*

BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM.

- *Yes, we **need to include ethics, to make young people aware that we are not only individuals, we are a collective,** which must be taken into account in our actions. These subjects/aspects are not touched except in some electives. Missing, it is not in the curriculum.*

IG_Remote Sensing & GIS Specialist

- *Okay, small is no longer worth it, you have to go to hierarchies. Many times it is the parents themselves who do not instill in the children, for example by taking a car, buying on amazon ... **Incorporate practices or measures that avoid resorting to the car**, in other cities they give you a public transport voucher, a bicycle ... Give a value of quality of life. I have the feeling that in Spain the car is financed...*

Moderator 2 asks AM,

- *In relation to the possibilities of public entities, on intentionality:*

AM_Project Manager AUVASA bus operator

- ***Dual nature of public management, ability to do things but also to ignore their good wills**. The CyL Board has a more demanding environmental regulation than the European ones. On the other hand, the Board's buildings are an environmental disaster. The possibility of teleworking with workers who come 1 hour away by car, moving every day from home to the office. There are processes for consulting regulations. But **there is a lack of political will in many cases**, with the implementation of low-emission zones, which are to comply with the standard. The cameras are not put on until the election is over. Cars passed through the historic areas of Burgos. **Administration little didactic and very accommodating with people who talk and complain**.*

Moderator 1

- *Is it also difficult to implement these changes in public administration?*

AM_Project Manager AUVASA bus operator

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- *Yes, even being the one with the most capacity. In social services management, they do not put a new occupational center, they hire externals, there is fear.*

Moderator 1

- *Would it be an engine of change?*

AM_Project Manager AUVASA bus operator

- *Absolutely. RIS3, is the strategy that leads more sustainable and healthy cities, but at the moment of truth, do we apply it?*

BM asks E_High school Student& A_student

- *Do you have a clear vocation, or have you thought about the possibility of working in planning?*

E_High school Student& A_student

- *Biotechnology, sciences applied to a real context, what biology can apply to life. I do not rule out biology, which would be linked to nature.*

Moderator 1

- *Next CoP, also on a Monday, May 29, from 17 to 18:00. Autonomous University of Catalonia, UOC, philosophy with interest in CC, focus that we leave to our future generations. In the next session, we want to see how to modify the program, give content about the university materials.*

In conclusion:

✓ Much more holistic changes and strategies, beyond small changes
✓ Certain business practices not in line with the fight against CC (transport of workers...)
✓ More social focus in engineering and technical subjects, social sciences
✓ Engine of change in administrations
✓ How to use and/or apply new technologies

Actions

#	Date	Description	Person/institution in charge
1	29th May	2nd session	

Session n#2

Meeting organiser: CAMBIAMO/ANDAIRA

Moderator: ANDAIRA

Note taker: CAMBIAMO

2nd session

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29 May 2023
17:00-18:00

Table 22 Agenda_session #2 Madrid CoP

#	Hour	Activity
1	17:00 - 17:02	**Welcome to the REFOCUS Community of Practice #2 | 2 min**
2	17:02 - 17:10	**Sharing the main topics from CoP#1 (Padlet) | 8 min**
3	17:10 - 17:40	**Developing focused contributions on these topics (Padlet) | 30 min**
4	17:40 - 17:55	**Discussion on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) | 15 min**
5	17:55 - 18:00	**Wrap-up and next steps | 5 min**

Table 23 Participants_ session #2 Madrid CoP

#	Stakeholder	Stakeholder Target
1	BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM	Educator
2	AM_Project Manager AUVASA bus operator	Organisation Transport Operator esentative
3	IG_Remote Sensing & GIS Specialist	Educator
4	DG_Representing the Spanish ecofeminist network	Organisation NGO
5	E_High school Student	Student 16-18 y.o.
6	E_High school Student	Student 16-18 y.o.
7	Moderator 1 Andaira	
8	Moderator 2 CambiaMO	
9	Moderator 3 CambiaMO	

Moderator 1

- Welcomes and appreciates the participation in this second session. The objective is to continue with these communities of practice, where different profiles participate: students, mobility and transport teachers, staff from the world of work, companies and activists. REFOCUS CoPs are being organised in Madrid, Antwerp, Delft and Greece.

Moderator 1

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- Presents the topics we have identified in the first session.
  - Much more structural changes and strategies.
  - Changes in mindset
  - A more social and eco-feminist perspective
  - Roles of public and private actors

- 10 minutes of reflection are given to develop ideas individually in the Padlet.
- **More structural changes and strategies, going beyond small changes.**

E_Student & A_Student

- They propose more accessible recycling measures, less plastic wrapping in packaged products, they give as an example: Germany.
- They propose the system of **Return System of containers, in addition to providing monetary reward.**

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM, AM_Gestora of Technological Projects of AUVASA and IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid propose:

- **Legislative changes** and that civil society has to push/pressure governments.
- **Civil society and NGOs have that role of pressuring governments,** of being observers, although governments are the ones who make the final decisions at summits.

Moderator 1

- What role does the university play in driving these more structural changes?

AM_Gestora of Technological Projects of AUVASA

- They highlight the role of the university as a framework to renew and update the knowledge of professionals who are already in the labor market.
- Continuous training **of professionals in sustainability and new technical advances in this line** are proposed.
- In the area of climate change, as the changes and advances are so intense and rapid, continuous training would be necessary.
  "They have a fundamental role. (The University) I expect the University to be continuous, not to be an end, I think now about the University, I am super disconnected from my University. If it had been a bit to promote continuous training."
  "I'm very outdated, kind of long-term maintenance that I eat recycling or something."
  "Never more appropriate than in this case, with climate change ... It's very easy to be outdated."

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- That this continuous training is not only incorporated into the framework of the University but **extended to activism or to more popular training centers** ("the street")
- Ensure **accessibility** to this knowledge, more **inclusiveness.**

  "I say that we need to train ourselves in some way, either by activism or by I do not know and maybe also take the University not only to the University but to the whole World, but to take it to others, to other areas, because such as neighborhoods."

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"Are there many people who have not arrived at the University or have not wanted the University, because maybe how to get those classes or those seminars to other people who have never been linked to the University?"

AM_Gestora of Technological Projects of AUVASA

- Highlights the importance of taxation to ensure compliance with the measures.
- Promote **public transport, which is free,** of quality.
- With this, guarantee the inclusion of gender, of class. Just like we have public health and education.
- *If we had that same perception with transport (the one we have with Health), we would have that quality transport that we can have for everyone and it is the way for us all to be much more equal, with access, and that is of quality for all, that is, for each other.*

- Change of mindset to highlight gains instead of renunciations.

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- Dissemination **of good practices** of companies.
- That the prestige of a company derives from its good practices (family conciliation) with workers and the environment

Exemplify those companies that are taking these measures, which are friendly places to work

E_Student & A_Student

- That the talks and trainings are based on real examples and that the focus is more on the benefits than on the obligations.

DG_ Coordinator of the ecofeminist network

- **Influencer for the dissemination** of new practices, new sustainable consumption modalities (clothing, travel).

Consume well. A is that they are greenwashing, not consuming so much, of course it is like the change that we have had all the people who are ecologists all our lives. We had not considered the planes, so much of course, and now to say that you leave 2 days already between us is frowned upon, it is not as it should be.

- A more social and eco-feminist perspective

E_Student & A_Student

- They do not know and ask, they are interested in knowing more about the eco-feminist perspective.
- The other participants are also interested in this perspective.

DG_ Coordinator of the ecofeminist network

- It explains what perspective is, assessing environmental impacts, but also from a gender perspective. *Consider that human beings are not the only ones who matter in life, so we reconnect, it is a way to reconnect with nature. The concept of empathy.*

Moderator 2

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- In the job interviews, lack of knowledge/sensitivity to apply the gender perspective in projects, ignorance of the concept of care mobility, etc. have been identified. Therefore, it is proposed to incorporate the perspective in engineering courses
- It is proposed as a theme for the next CoP: ecofeminist indicators, ways of application to projects

DG_ Coordinator of the ecofeminist network

- He comments on the high demand that more than 600 students have had this last period.

Image Appendix 5 Padlet Madrid CoP

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Actions

#	Date	Description	Person/institution in charge
1	28th June	3rd session	

Session n#3

3rd session
28 June 2023
16:00-17:00

Table 24 Agenda_session #3_Madrid CoP

#	Hour	Activity
1	17:00 - 17:02	**Welcome to the REFOCUS Community of Practice #3 | 2 min**
2	17:02 - 17:07	**Sharing the main outcomes from CoP#2 | 5 min**
3	17:07 - 17:47	**Developing specific proposal on future-oriented curriculum | 50 min**
5	17:47 - 18:00	**Wrap-up and next steps | 5 min**

Table 25 Participants:session #3_Madrid CoP

#	Stakeholder	Stakeholder Target
1	BM_Associated professor at Dept. Forestry and Environmental Engineering and Management -UPM	Educator
2	AM_Project Manager AUVASA bus operator	Organisation Transport Operator esentative
3	IG_Remote Sensing & GIS Specialist	Educator
4	E_High school Student	Student 16-18 y.o.
5	E_High school Student	Student 16-18 y.o.
6	Moderator 1 Andaira	
7	Moderator 2 CambiaMO	
9	Moderator 3 CambiaMO	

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The moderator comments that this is the last CoP in Madrid. We will have an international one with the other CoPs, in Greece, Antwerp, Delft, in September. Remember the objective: co-design of a curriculum for shipping, logistics and transport engineering.
Remember that they have addressed the role of governments, NGOs, private companies, education centers, see how they can integrate concepts of green operations and also how to train professionals with this approach. In this session we would like to delve deeper into the role of the university, which is the ultimate goal.

With all approaches (activism, business, students/teachers) we can build something very useful:

- Share course proposal and we are commenting
- Moderator 1 shares screen with course file - providing content - form and methods

- TITLE
- OBJECTIVES
- MODALITIES
- DURATION
- TARGET AUDIENCE
- DESCRIPTION
- UNITS

Moderator 1

- *What would be the target student audience*?

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid & BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM.

- They agree that this course would be more focused on master's courses. For undergraduate students they consider that it is complex and that they study more basic concepts.
- They consider that impact assessment could be introduced. According to the university professor, because of her experience, this type of knowledge is more convenient at the end of the degree or master's degree.

Moderator 2

- It introduces into the discussion the methodology of “paseos conscientes en la naturaleza”, according to recent experience of an event. Consider the course not just like sharing content, but more about re-establishing connection with nature (e.g. forestry school). *Can it fit in relation to the experiences that are already made in close environments?*

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM.

- She comments that they are called “baños de bosque” and they already talk about it in a normal way, it could be implemented.

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- *I would not leave it only as forest baths, but also going to places where there is already a climatic effect. Pests, e.g. enjoy walking in the countryside but also seeing the consequences of climate change to be aware of it.*
- *A practical way to look at environmental impact.*

Moderator 2

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- *And something similar in transportation? where there is a visible effect of climate change.*

AM_Gestora of Technological Projects of AUVASA

- *A university professor told us that roads brought landscapes to people. A type of mobility that helps those dives to nature, that arrival is with a means of transport.*

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM.

- *You can look for something on another scale.*
- *The landscape impact.*

AM_Gestora of Technological Projects of AUVASA

- *On very long trips you watched... from Castile to Galicia, three different ecosystems. The charm, parameters of quality of the landscape related to mobility, that make you appreciate the landscape, but in a sustainable way. For example, traveling by train, with little encroachment on the environment.*

Moderator 1

- *It can be related to the introduction of the story of earnings versus resignations.*
- *And this social or gender perspective, how can we introduce it in engineering?*

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM.

- *In a practical way, doing urban audits, as the simplest. Putting yourself in the place of the different agents, seeing how they affect you as a woman, an old man, a child...*

Moderator 1 and 2

- *What do you think about the proposed 16 hours? Could audits be a module?*

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM.

- *I agree*

Moderator 1

- *Introduce a more collective, less individualistic perspective. Ethics, how can it be considered when planning projects? Do you see it as relevant?*

BM_Universidad of Geographic Information Systems at the ETSI of Forestry, Forestry and the Natural Environment of the UPM & AM_Gestora of Technological Projects of AUVASA

- They agree that engineering has a very individualistic approach and that a more collective perspective is much needed. They consider that it is something that is taken for granted but the collective work is not done.
- They consider that there is little communication between students and that if we want to create groups.
- They propose to carry out role plays, so that they understand the perspective of the different actors that participate in the ecosystem.

BM_Universidad of Geographic Information Systems in the ETSI of Forestry, Forestry and the Natural Environment of the UPM

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- We have posed challenges, for example, to generate cartography, through maps of pedestrian paths for a children's school. Students have to see methodologies, talk to the different actors/users... Co-create with them your final product. It can be posed like this, considering those who are going to use their solutions.

Moderator 1

- It suggests that evaluation could introduce participatory and co-creation methodologies to encompass this holistic view mentioned in previous sessions.
- Question on the topic that AM commented on the knowledge of demands and requirements of mobility and public transport projects requested by the administrations---

AM_Gestora of Technological Projects of AUVASA

- It considers that evaluations are made without criteria. You do not consider that public transport is sustainable, in the face of an industry that pollutes, for example. The sustainability of public transport is very little thought out.
- She believes that this approach to sustainability is lacking, he doubts if they have enough current information on sustainability. He re-emphasizes that transport has to become public, nothing private, and it will have to be sustainable.

Moderator 1

- *In terms of legislation and regulations, do you think it is important to include this knowledge? has been commented on in other CoPs*

BM_Universidad of Geographic Information Systems in the ETSI of Forestry, Forestry and the Natural Environment of the UPM

- *I think so, it's a competitive advantage for them. Even if they do not work in administration, these aspects can be a strong point if they are trained in legislation and regulations.*

AM_Gestora of Technological Projects of AUVASA

- *You have to train in the previous steps and a post in the projects. How you get to a project, e.g. a windmill, from its planning and definition, implementation costs, implementation impact, understand all impacts. I think it's important to consider this.*
- She believes that it is not formed in planning, for example, in materials, etc., there is even consideration of replacement, when the useful life of this technology ends.
- It highlights the importance of digitalization in transport, we have problems charging electric buses at night.

Moderator 2

- *Should a technology module be added to the proposed curriculum?*

AM_Gestora of Technological Projects of AUVASA

- *I think 16h is very fair to include everything we are discussing. What is included should be prioritized and calibrated, but I think it would be important to integrate it.*

BM_Universidad of Geographic Information Systems in the ETSI of Forestry, Forestry and the Natural Environment of the UPM

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- Include life cycle analysis applied to mobility. But there are many topics for 16h.
- It proposes to carry out a project with a specific case, an interesting mobility project that includes all these perspectives that we are discussing.

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- She agreed with what had been raised by the other participants. In this sense, it proposes to propose a work as brainstorming based on that mobility project, a specific case, giving guidelines to generate ideas and knowledge, valuing that it has been missing and that it is good, to do an evaluation exercise in sustainability.

Moderator 1 and moderator 2

- *Could we propose more hours, do you think it is very pretentious?*
- *As the question of co-creation has come up, perhaps it should have more the form of a workshop than as a subject, what do you think?*

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- It states that depending on the duration of the master's subjects with the hours of study, all the topics that are being raised may be too much for 16 hours.

Moderator 1

- *Is it considered as continuous training rather than a subject? In this CoP we see that there is a lot of content to include and we are proposing more hours.*

In relation to the duration of the curriculum is agreed among all participants.

- 10 face-to-face hours with 10 and 15 hours of student work.
- Another proposal is 15 face-to-face hours and 5 hours for each module and another 15-20 hours in which students will occupy and work on the projects they have to carry out.

Moderator 1

- *In relation to expert seminars?*

BM_Universidad of Geographic Information Systems in the ETSI of Forestry, Forestry and the Natural Environment of the UPM

- Seminars to deal with very specific topics.
- Important evaluation and training in life cycles of projects.
- Importance of participatory and group work of students

Moderator 2

- It proposes to the participants to collaborate in the content of these modules (participatory methodologies, co-creation, ecofeminism)
- They are all very grateful and delighted to be able to participate.

BM_Universidad of Geographic Information Systems in the ETSI of Forestry, Forestry and the Natural Environment of the UPM

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- It highlights the importance of innovating who teaches these subjects. Sometimes it remains an anecdote, that they imply these concepts of participation and sustainability, not so much as a way of thinking, but when designing.

Moderator 1

- *In the business world, do you know someone who introduces good practices that we can include as content?*

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- *We have projects that are operational groups. Different types of entities are grouped, company with needs, users, university, work together to solve a need to create a specific product. They sit down with users to define objectives, they work together.*
- *A potential user contributes their needs to ensure that what you propose works. Have feedback as soon as possible, without waiting for the final product, in short periods of time to receive criticism or the opposite to tackle problems from the beginning.*

Moderator 1

- *This could be considered as introducing a participatory methodology for social efficiency.*

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- It is increasingly clear that this way of working is necessary, so as not to reach failure, but to work collaboratively during the project.

AM_Gestora of Technological Projects of AUVASA

- She agrees to work in a more collaborative way with the end user. For example, in transportation it happens to them that, you design a bus, and it does not fit with the public because you have not discussed it before with them.

Moderator 2

- She believes that this way of working has a lot of potential.

AM_Gestora of Technological Projects of AUVASA

- *Sometimes we work on "everything for the people but without the people" and move away from those who use mobility services.*
- *If we want to provide service in a sustainable way with a long journey, I consider that it is the way to approach it, from sustainability and also from risk prevention, not only a sustainable service, but sustainability is a measure of prevention of occupational risks.*

Moderator 2 shares this post:

(https://sostevidabilidad.colaborabora.org/)

- Soste[vida]vilidad - Guide to a venture that puts life at the center
- Collective and experimental edition of a practical guide with tricks and remedies to move towards a culture of entrepreneurship more.

Moderator 1

- She insists on introducing the narrative of profit versus renunciation. From collaborative designs, all parties win, worker and company.

AM_Gestora of Technological Projects of AUVASA

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- *We all live in the same place, you are a worker, a citizen, an inhabitant of a place. The environments are separated, but in reality, we are all at once.*

Moderator 2

- *How can we make people understand it? How can we introduce it to the university/business world?*

AM_Gestora of Technological Projects of AUVASA

- She mentions the daily struggle to introduce concepts of sustainability, emissions, sustainable driving with his working environment.
- She considers that a good approach to apply this perspective is prevention in health, presuming that these changes can produce improvements in the quality of life.
- She comments that Valladolid is a city of 2030 climate neutral, where that funding comes from, 20% public and 80% private. It highlights that only companies are profitable climate neutrality.

Moderator 1

- *The issue of the increase in the quality of life, do you see it as something important to include in this training?*

IG_Remote Sensing & GIS Specialist. AGRESTA S. Coop.Universidad Politécnica de Madrid

- *I find it interesting, but I would not know how to approach it when teaching or showing it. Let it not sound like evangelizing in this. I see complex how to translate it into the course. The challenge is how to combine environmental assessment (technical) with a way of thinking, collaborative, participatory, is the puzzle that must fit that can be very powerful.*

Moderator 2

- She remembers that in September there will be a transnational CoP to share the results of each CoP, which are quite diverse, and the intersectionality of the four groups is going to be very interesting.

Table 26 Future-oriented Madrid CoP

TITLE	**Curriculum sobre sostenibilidad y resiliencia climática para el transporte, el shipping y la logística**
OBJECTIVE	Provide a comprehensive understanding of the skills required by the market or NGOs, going beyond what universities typically offer. The aim is to propose concrete content that addresses sustainability and climate change awareness in the areas of transport, shipping, and logistics.
TYPE	In the next section

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DURATION	10 face-to-face hours with 10 and 15 hours of student work. Another proposal is 15 face-to-face hours and 5 hours for each module and another 15-20 hours in which students will occupy and work on the projects they have to carry out.
TARGET	Focused on master's students In the degree courses brief introduction to impact evaluation
DESCRIPTION	Aspects to be covered during the training: (Topics collected in the previous sessions) • Introduce the gender perspective, gender analysis in studies and designs in engineering. • Introduction to ecofeminism in engineering. Ecofeminist indicators, ways of applying them to projects • Introduction of a social perspective • Introduction to the circular economy Proposals in this session • Ethics, more collective and less individualistic perspective, think about projects from this approach. • Knowledge about the demands and requirements of mobility and public transport projects that administrations are asking for • Introduce the story of earnings versus resignations. • Include lifecycle analysis applied to mobility
METHODS	More immersive learning experiences: • "Forest bathing" • Field visits where the impact of climate change is observed. • Urban audits • Role play; understand the perspective of the different actors involved in the ecosystem and how they impact them Encourage teamwork among engineering students (usually very individualistic) Practical mobility project Seminars with experts to deal with very specific topics.

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Actions

#	Date	Description	Person/institution in charge
1	September	Transnational session	

UANTWERP CoP

Session n#1

Meeting organiser: UANTWERP /CAMBIAMO/ANDAIRA
Moderator: CAMBIAMO
Note taker: ANDAIRA
1st session
19 April 2023
16:00-17:00 (EEST)

Table 27 Agenda_session #1 UAntwerp CoP

#	Hour	Activity
1	16:00 - 16:05	**Welcome to the REFOCUS CoPs**
2	16:05 - 16:15	**Tour de table on motivation and expectations of participants from REFOCUS CoP**
3	16:15 - 16:25	**Warm-up / Ice breaker** (e.g. share an object)
4	16:25 - 16:30	**Group arrangement**

5	16:30 - 16:50	**Launch of key ideas, narrative of the CoP**
		● POSSIBLE QUESTIONS:
		  ● Potential incidence in teaching / your organisation - what can be changed (FOR TEACHERS/ORGANISATIONS)
		  ● … (FOR STUDENTS)
		  ● Good practices related to sustainability
		  ● (Brainstorming about REFOCUS module)

6	16:50 - 16:55	**Wrap-up** ● TOPICS FOR FUTURE CoPs

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7	16:55 - 17:00	**Closing remarks**

Table 28 Participants_session #1 UAntwerp CoP

#	Stakeholder	Target stakeholders
1	TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics	Educator
2	RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics	Educator
3	EH_Professor the University of Antwerp _ Transport and regional economics	Educator
4	WS_Student 18-22 y.o _ University of Antwerp	Student 18-22 y.o
5	B_High school Student 16-18 y.o	Student 16-18 y.o
6	GS_Advisor Mobility and Logistic	Organisation Business representative
7	VC_Post-Doctoral Researcher from the University of Antwerp	Student 22-25 y.o
8	LD_Student 18-22 y.o University of Antwerp_Logistic	Student 16-18 y.o
9	MD_NGO	Organisation
10	Moderator 1 CambiaMO	
11	Moderator 2 CambiaMO	
12	Moderator 3 Andaira	

I.<u>Warm-up</u>

(10)
presentation
coffee
Mask climate change, feminist activist

(GS_Advisor Mobility and Logistic)
Walk refugees.
She likes to walk a lot, but she doesn't do it to "feel how a refugee would do", but as a way to put herself in their shoes. This practice is done because it is a good way of seeing that life is not easy.

Plants
flemish ONG

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(4)
Graduated last year at the University of Antwerp, and I started doing a PhD also at the university
Sport shoes
I love sports.

(5)
16 years old
Secondary school
Greek latin dictionary
Language
Follows Greek & latin. He likes languages and reading texts (also do the translation). That is what represents Bram

(3)

Radio 1962 produced in Germany
From lost cost area
Postdoc University Antwerpen.
He has a hobby of restoring old artifacts. in this case, his most recent restoration is the radio that he carries with him.
He's also a postdoc at the university of Antwerp

(2)
laptop
Connect or not connect to the internet.
His laptop is his friend. He spends most of his time on it. Since the pandemic, he has learned a lot from teaching a lot through the laptop and from meeting in virtual meetings like this one.

(7)
Post doc research at university of Antwerp
master maritime and logistic
Different bachelors
I am teaching
I don't have anything around me
my phone it is a picture of my son
He also talks about IA, how new technologies can be implemented and other solutions, the economics of these technologies, etc.

(8)
Second master
logistics management
University of Antwerp
She doesn't have a camera, but she says she would how her soccer ball and all sports overall

(11)
Mobility researcher at CambiaMO
Interested in citizen engagement
Focus of her research in mobility solutions and technologies (sustainable world)
Coffee lover

(12)
Works in Andaira, a nonprofit organisation that does social research.
She's a sociologist and anthropologist
Choose 2 animals because she's very concerned about the national park problems, especially in Spain.

II. Presentation program Erasmus + project

Moderator 1
She's doing the welcome to REFOCUS:

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REFOCUS is oriented to rethinking the contents of some materials of the training on the education. And in that case, it's education in the University.

Countries of CoPs

- Greece
- Belgium
- Netherlands
- Spain

Contents of today's meeting (the agenda):

- Language facilities
- Objective of 1st session: meet each other's.
- This meeting will be managed in English, and even though it's not the mother tongue of all the participants it's the better option so everyone can talk and understand each other.

Starting point: **Transport is one on the responsible at 30% of the climate change**.

Moderator makes an invitation to think about: "We need to take this responsibility about climate change in some way like the people who are working in this vector," In two ways, as passengers and climate change workers or students.
Increase the awareness, it's quite important, but especially the action, the advocacy from the action.

b. Objectives:

- Understanding you either from the article's certificates one or more less Scientific's ones. Features for passengers. For goods.
- Understanding the strategy for a fight against climate change and what is the role of universities, the courses.
- How could be oriented or included.
- One important aspect to ensure that we don't leave no one behind.

c. CoPs rules:

"The knowledge is coming from a different perspective. So there are no people with more or less knowledge but all the knowledge are equally represented here and this is why we would like to define this community of practices". CoPs is composed of professors, students & practitioners, researchers.

III. Expectations from the community of Practice about climate change

Moderator 1

- What are your needs and ambitions as professors? As students, as individuals about these meetings and CoPs?

GS_Advisor Mobility and Logistic

- I think there are two ways when we talk about sustainability and transport and logistics and the most.
- The thing that is most common nowadays is the whole area of **modal shift.**
- we're building now or we're gonna build it. And a new infrastructure, **but it will only work if we realize a modal shift.**
- We know what to do about it. But the other thing is the infrastructure we're building now and what we need now is it future proof, the innovations we're doing is that what we will need. Within 30, 40, 50 years, and I think that's more difficult nowadays because we don't know how the world will be.

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GS_Advisor Mobility and Logistic also wonders about the following questions:

- **Which are not the right innovations for mobility. You have to hold a discussion about self-driving cars.**
- **What are the mobility needs in the future?**
- More sustainable weight of transportation, that's no discussion.
- **What kind of innovations do we really need?**
- Which kind of structure?
- Way of crossing the river scales (main aim of the project)

Moderator 1 : The innovation would be the solutions

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics

3 raises the following concerns:

- Are we doing the correct? Is the innovation that we're doing is correct, is it the correct way to do it and the way that I think about it?

- **We're coming up with innovation under a certain set of constraints that have are coming.** Are defined to us by our past.:Let's say the size and dimension and weight characteristics and everything that the freight vehicle is Rd [...] We know it's going to be approximately 40 tonnes etc. So, our past dictates where we can go with our innovation…

- I think that we are very constrained. **We can't just say, OK, now we will drop everything because there's too much sunk cost.**

Moderator 1:

- *Indeed, some cost. And these costs are going to be barriers for climate change?*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics commented about:

- ***If you look towards the dimensions of the main roads in Europe or basically all over the world they are set by the Romans***.
  The Roman Empire built all the high built, most of the major roads.
  So this is based on nature and those things were transferred from 2000 years ago when we still were set by those boundaries because everybody builds the infrastructure in the same way with the same types of dimensions. ***So, it's not hindering new innovations, but it sets boundaries into what we can actually do.***
- *For example, we built large ships in the past and we still do. MD_NGO00 years ago, those ships were 40 metres, 50 metres long. Those were big ships, but today we call them small. So, we are set in these things which are say look in effect and which we have to deal with.*
  it's an additional challenge, it's not hindering, it's a challenge.

MD_NGO

- *Would like to continue this climate question because she works for climate organization.*
- *I think also it's we are in a world that is like rapidly changed and we have* ***to be climate neutral in 2050.***
- *We have terms like a* ***circle economy.***
- *I think* ***it's important to see****, what are all the factors that we have to be taken into account not only costs for like* ***what is the price but also like the external costs.***

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- *And **that will adapt or mobility systems and our logistic and our supply chain**. And so that's something that I'm curious about through to see **being more reflective.***

Moderator 1 Invites to see this concern from the student's side. *What are your expectations?*

WS_Student 18-22 y.o _ University of Antwerp

- The lessons that I got and the things I learned were about **the importance of sustainability**, these are *the necessary innovations to green the entire transport chain because **there is no single solution. It's a combination of many factors. And I think that you have to teach students about these factors**, then you can really teach them something they will remember for the future and that they will apply in their jobs*
- *Technologies are ever changing, and things are going very fast. **But if you have the right mindset, then I think that you can do much more after your study.***

Moderator 1

- *do you think that in the training, in a practical way, do you expect more? Less? Do you receive the right content?*

WS_Student 18-22 y.o _ University of Antwerp

- *I think that if you really want to go deeper into these innovations, then the technical aspects you can learn on the job or **but if you have limited time, then I think that the mindset is more important, to motivate students is more important than all these specific formulas and technical aspects.***

(B_High school Student 16-18 y.o

- *I think it's really important to create, first of all, **awareness of the things, that the climate is changing and that we need to do something and then we can really change things**. But first we need to see the problem and **we all need to know that there is something wrong**.*
- *Climate empowerment (an awareness problem is the key)*

Moderator 1: *Which kind of answer or action you have in mind for ground this concern?*

L_Student 18-22 y.o¬ University of Antwerp

- *I think it's important in such a short time frame **to let us students search for innovations or ideas about different topics ourselves** and discuss them.*

- *I like that we get **the freedom to find some innovations ourselves**.*
- *appreciate the autonomy we're given to discover innovations on our own. I believe it holds greater significance than merely being taught about the existing array of innovations available today.*

Moderator 1: makes an invitation to see the issue of innovation from a more academic perspective. *How do you engage with this innovation? For example, the innovation of IA.*

VC_Post-Doctoral Researcher from the University of Antwerp

- ***How to use the tools that we have now in the innovation to make better plans for the future and also to see whether these plans**.*
- *Are really what we expect? **are really ethical?** For example, the really match at the expectations of what's as a society and they would like to refer you to artificial intelligence on how we can use this? for example,*

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to look into the future, to analyse a lot of data and then to come up with solutions that that fulfil our needs and also ethical.

- ***What not clear yet is how to use this** and **how to cope with this in education** and to the methods that you used to teach students. I'm leading a group of students who need to write a report. He needs to write the thesis.*
- *Students come to ChatGPT to ask questions about different topics. They use it to get information and help on various subjects. ChatGPT has been trained on many different things, so it can provide answers and talk about lots of different stuff. Students can ask questions and ChatGPT will try to give them good answers and explain things to them.*

Comments about risk of innovation:

- *We don't have any backup plan to address it*
- *We probably are going to follow that and this is how the students are thinking nowadays. I mean, **I have this example, they just think that they can cut corners and then use that to pass an exam.** But Those students, they would have to work in the future…are they going to be able to do that? **these are struggles that I'm thinking the innovation it's good.***

Moderator 1*;* *The importance of the climate changes courses and innovation to create social discussion.*

B_High school Student 16-18 y.o

- *I think that can be very useful because **the more we learn about it and talk about it, the more we all can really understand what the problem is exactly**. And the more we can change after it. So, I think it's important to have a course or something about the climate changing the things in the environment so we can all take part in the conversation and **we all can change things in our own ways and communicate about it with the other people.***

VC_Post-Doctoral Researcher from the University of Antwerp

- ***The main reason for the climate change and the problems that we have regarding to that are us the people.***
- *But the question is how we can still carry on with our activities and with the things that you do and that we want to do without affecting the climate.*

Moderator 1: *Everyone involved, international strategy*.

MD_NGO

- *I think that is the key answer that we need to come up with and indeed your being climate neutral, that's good, but the problem is that it's not supplied everywhere in the world. If you look at the China and India, I mean we can be here on a very small land like Belgium as a climate neutral as we want. **But it's an action that has to be taken by everybody, and then how you convince everybody to do that, and are they really taking those actions***

MD_NGO

- *But in the end, if even China, India, America is not changing, we will see the climate change around us, it will have trouble and on waterways and everything like that. So, I think it's really important that.*
- *Talk to the students because I think in the future especially.*
- *The supply chain will have to be resilient on quite a lot of factors because we will be.*
- ***A lot of challenges that we some can foresee, some we cannot foresee yet.***
- *I think that the students were coming to these classes will be taught, **flexible and resilient for the future.***

Moderator 1: *Ways to face it…*

EH_Professor the University of Antwerp _ Transport and regional economics

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- *They're basically two streams extreme,* ***one is we destroy everything, and we rebuild everything from scratch with the latest and newest technology possible****. That's very costly, takes an awful lot of time, and is most likely also not sustainable. And we also need the process, all the waste.* ***The other thing is that if we have the infrastructure that's there, we could tailor it and update it and change it into such a way that we can make more use or better use of for instance 0 emission fuels.***

- *You could think about installing electrical charging systems on highways every 60 kilometres, which is according to Europe not the plan, that you could also think about the project where Roman worked on is installing centenary systems over highways. This is adding things to the existing infrastructure in order to facilitate this transition to 0 emission fields or 0 emission energy sources. This is not only possible for road infrastructure, but also for real infrastructure also for not what way infrastructure.*

- *That's the way to move forward and not another thing that's also linked to that, especially when you talk about emissions is that a lot of all the transport is derived the month. So,* ***it means that if we transport less stuff, there is also less emissions.***

Moderator 1: *The mental shift and the pricing mechanisms to face the climate change and the over production. How to address social issues?*

GS_Advisor Mobility and Logistic

- *And but it will have a cost and there we need the mental shift as well and, again, in transport economics we can, we know that if* ***we use pricing mechanisms, we can force people to make the right choice.***
- *You have* ***the social issues*** *which need to have guts to do it. And that's the aspect which I'm missing. How we know what to do if we use pricing mechanisms, we can go.*

They introduced social, inclusive, there a lot of question… Holistic approach

EH_Professor the University of Antwerp _ Transport and regional economics

- ***Need a holistic approach*** *because if you look towards the spatial planning issue.*
- *People are compensating that by giving employees a car and fuel cards, which means that people are making more use of road transports. So that's in essence, its taxation issue which results back into problems on the road.*
- *In order to deal with this, you need to basically have a holistic approach and essentially you need to take it out of the hands of the politicians because politics only have like another scope for four years. But that's maybe too far for this program.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics

- *I was thinking already before this meeting as a transport economist, we are working very narrowly on something and then later in life it turns out that I need to get this knowledge from this field and this knowledge from that field.*
- *We recall the origins of science, where there was a scientist who worked at the university. This person was* ***a generalist, meaning they had knowledge and expertise in various fields.*** *They could work on physics one day and switch to chemistry the next, embracing a mix of disciplines. However, as we moved towards the early 20th century, around the 1920s, specialization became more prominent in specific scientific fields. We departed from the era of being generalists and began focusing on specific areas of expertise.*

Comment around the Iceberg image…

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- *It's more and more a going out that this is kind of iceberg and then and the behavioral change is something that´s determined by the structures, the mental models and, of course, there are the policies who are more related to the conjunction. I don't know the pattern but the things that are going more on the deeper aspect of the mental models or what we can say, like the mandate, for example, they say social mandate and environmental mandate, our gender mandate.*

Topics discussed throughout the session and could be discussed in more depth:

- The need for a holistic approach to dealing with transportation issues, including consideration of external costs.
- Restrictions and barriers in the implementation of "friendly" innovations with the climate.
- The importance of interdisciplinary studies and education programs to address the limitations of working narrowly in one field.
- The need for a social discussion and understanding of climate change in terms of its impact on transport and the environment.

Actions

#	Date	Description	Person/institution in charge
1	17th may	2nd session	

Session n#2

2nd session
17 May 2023
16:00-17:00 (EEST)

Table 29 Agenda_session #2 UAntwerp CoP

#	Hour	Activity
1	16:00 - 16:02	**Welcome to the REFOCUS Community of Practice #2 | 2 min**
2	16:02 - 16:10	**Sharing the main topics from CoP#1 (Padlet) | 8 min**
3	16:10 - 16:40	**Developing focused contributions on these topics (Padlet) | 30 min**
4	16:40 - 16:55	**Discussion on best teaching practices and needs, existing programs (content, location, fees, etc.) | 15 min**
5	16:55 - 17:00	**Wrap-up and next steps | 5 min**

Table 30 Participants_session #2 UAntwerp CoP

#	Stakeholder	Target stakeholders

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1	TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics	Educator
2	RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics	Educator
3	EH_Professor the University of Antwerp _ Transport and regional economics	Educator
4	WS_Student 18-22 y.o _ University of Antwerp	Student 18-22 y.o
5	B_High school Student 16-18 y.o	Student 16-18 y.o
6	GS_Advisor Mobility and Logistic	Organisation Business representative
7	VC_Post-Doctoral Researcher from the University of Antwerp from the University of Antwerp	Student 22-25 y.o
8	Moderator 1 CambiaMO	
9	Moderator 2 CambiaMO	
10	Moderator 3 Andaira	

a. Housekeeping Rules (because of the Padlet activities)

- Stay muted while not speaking.
- Raise hand to speak.
- The session will be audio and video recorded.

b. Contents of today's meeting:

1. **Welcome to the REFOCUS Community of Practice #2 | 2 min**
2. **Sharing the main topics from CoP#1 (Padlet) | 8 min**
3. **Developing focused contributions on these topics (Padlet) | 30 min**
4. **Discussion on best teaching practices and needs, existing programs (content, duration, locations, fees, etc.) | 15 min**
5. **Wrap-up and next steps | 5 min**

1. **<u>Welcome to the REFOCUS Community of Practice #2 | 2 min</u>**

Moderator 1:

- *This is the second community of practices, and today we will delve deeper into the teams and subjects that were discussed during the first community of practices. It is important to review the data presented and ensure that the rules remain consistent. Our goal is to share the main topics that were developed during the first session, with a focus on gathering inputs and contributions that can be included in the curriculum for students.*

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2. Sharing the main topics from CoP#1 (Padlet) | 8 min

Moderator 1:
In today's session, we will use a Padlet to gather information on three main topics:

a. Not all technological innovations are justified; a holistic approach is needed.
b. Emphasize mindset change over technical knowledge for climate change.
c. Consider the ethical implications of technological innovation.

These topics directly impact the curriculum. You have approximately seven minutes to contribute your ideas on the Padlet. Click the plus sign under each section to share your thoughts from the perspective of university teaching, students, civil society, or the labor market.

3. This was something that was quite strongly highlighted during the last community of practices Developing focused contributions on these topics (Padlet) | 30 min

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

(About ‘‘not all technological innovations are justified, a holistic approach is needed’’):

- T*echnological innovation should be economically justified to ensure efficient resource allocation in society. It promotes the sustainability of the innovation without relying on subsidies and ensures that external costs are appropriately compensated.*

(About the topic 2 ‘‘more focus on changing mindsets than on increasing technical knowledge for climate change’’):

- *Changing someone's mindset is akin to a religious question in the sense that it involves belief versus tangible evidence. It is challenging to persuade someone solely with evidence when it comes to shifting their mindset.*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *The decision-making mechanism lies in prices, and I also agree with the notion that we are not a religious entity preaching what is right or wrong. We are not like Jehovah's Witnesses imposing our beliefs. It is up to individuals to make their own judgments. Our **role is to demonstrate the impact of not internalizing external costs, and it is ultimately the students' responsibility to make informed decisions.***

WS_Student 18-22 y.o _ University of Antwerp:

- Informing students in an **objective way.**
- *It is important not to influence or manipulate the information and allow the students to decide for themselves whether they want to take action. Providing honest and unbiased information is the best approach*

Moderator 1:

- The team's discussion relates to the iceberg theory, which explains how many climate change policies mainly target visible aspects like CO2 emissions. For instance, shifting to electric cars is a common approach. However, this represents just a small part of the problem. Electric cars still have dependencies on materials with lower emissions, and their usage still impacts the planet. To address the issue more effectively, policies should focus on behavioral change. For example, promoting campaigns that encourage using electric cars only when necessary and supporting local businesses like nearby bakeries. These ideas align with the theory and its implications.

EH_Professor the University of Antwerp _ Transport and regional economics:

- *In medical lectures and general education, our role is to provide the most current knowledge on a given topic. By definition, we are **neutral and not in a position to impose or promote political messages**. We are educators, not politicians or religious figures. Our purpose is to share views and knowledge documented in literature. We can convey messages and promote understanding, allowing students to*

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develop independent thinking. Empowering students to make up their own minds is the fundamental aspect of what we do.

VC_Post-Doctoral Researcher from the University of Antwerp:

- *I agree with Edwin's viewpoint regarding ethical concerns, including the misuse of AI technology within legal boundaries. It is not our place to determine what is right or wrong, as different individuals may have opposing judgments. Therefore, it is essential to establish a legal framework for the use of AI and technology to address these issues.*

Moderator:

- *The information received in your courses is perceived as neutral from the student point of view. What are your thoughts on this?*

L_Student 18-22 y.o¬ University of Antwerp:

Agrees that the information is neutral.

- Appreciates the inclusion of guest lectures, which provide up-to-date insights from various perspectives, such as professionals in the industry.
- Believes this combination of viewpoints helps students gain a comprehensive understanding.

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- Raimonds expresses concern about the ethical implications of innovation.
- Worries about the impact on job opportunities due to technological advancements and increased efficiency.
- Raises the question of how universities can equip students with the necessary skills and empower them to thrive in this changing landscape.

VC_Post-Doctoral Researcher from the University of Antwerp:

- *Academia can play a crucial role in addressing medical issues by conducting interdisciplinary research. This research goes beyond just economic and technological considerations, as it also examines the legal framework governing the implementation of AI.*
- *By delving into the legal perspective, academia can assess whether certain AI solutions or technologies comply with established rules and regulations. This comprehensive approach ensures a thorough understanding of the implications of AI in the medical field, facilitating well-informed decision-making processes.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics:

- In addition to the previous point, there is an aspect beyond more observation and belief when it comes to decision-making. It involves evoking emotions and influencing individuals to recognize the distinction between the right and wrong choices. This can be achieved through pricing mechanisms. For example, someone who desires to drive a polluting car would be required to pay a higher price compared to someone who doesn't.

EH_Professor the University of Antwerp _ Transport and regional economics:

- *I believe that the **deciding mechanism is prices**, and I agree with the notion that we are not a religious entity preaching what is right or wrong. It is a judgement that individuals should make on their own. Our role is to demonstrate the impact of not internalizing external costs, and it is up to the students to make their own decisions.*

WS_Student 18-22 y.o:

- *I think the best approach is to inform students in an objective manner without influencing their choices. I believe in providing honest and unbiased information, allowing students to decide for themselves whether they want to take action.*

Moderator (about Iceberg Theory):

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- *I agree with Edwin, but as an educator, my job is to present the information. It is up to the students to decide whether they want to embrace it or not.*
- *Impact of the courses... Acceptable or have a more or less impact?*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *As educators, our role is to provide unbiased and up-to-date knowledge to our students. We are not here to impose our beliefs or ideologies but rather to present information based on research and literature. We encourage critical thinking and independent decision-making among our students.*

VC_Post-Doctoral Researcher from the University of Antwerp:

- *I agree that ethical considerations should be addressed in relation to AI and technology. We need a legal framework to determine the boundaries of their use. It's important to strike a balance between innovation and ethical principles.*

Moderator:

- *From the student's perspective, the information we receive is presented in a neutral manner. Guest lectures offer diverse perspectives and keep us updated.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *Innovation brings efficiency but also raises concerns about job displacement. We must empower students to navigate this changing landscape and secure their future.*

VC_Post-Doctoral Researcher from the University of Antwerp:

- *Innovations have had both positive and negative consequences throughout history. We should embrace progress while addressing its implications.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *Agreed. We must equip students with the skills and knowledge to thrive in this evolving landscape.*

Moderator 1:

- *How can we effectively prepare students for key aspects of life and decision-making?*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *A collection of courses with a holistic approach and a generalist viewpoint is essential.* ***Practical skills alone are not enough; critical thinking and understanding interdependencies are crucial.***
-

Moderator 1

- *How can we incorporate sustainability and climate change into the curriculum?*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *We must acknowledge that future systems may surpass our intelligence, and ethical considerations arise. The responsibility to control advanced systems becomes a significant concern.*
- *We must prepare ourselves for future systems surpassing our intelligence.*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *As an educator, my role is to provide unbiased and up-to-date knowledge to my students. I understand that it is not my place to impose my beliefs or ideologies on them. Instead, I strive to present information based on research and literature. I strongly believe in fostering* ***critical thinking and independent decision-making among my students.***

VC_Post-Doctoral Researcher from the University of Antwerp:

- *I personally agree that addressing ethical considerations in relation to AI and technology is crucial. We need a legal framework to establish the boundaries of their use. Striking a balance between innovation and ethical principles is of utmost importance.*

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B_High school Student 16-18 y.o:

- *Speaking from my own experience as a high school student, I feel that the curriculum often lacks attention to life outside of school. We primarily focus on subjects like mathematics and literature, but there is little guidance on how to navigate real-life situations. I believe it would be beneficial for schools to dedicate more attention to preparing students for life beyond the classroom. Guest speakers sharing their experiences or practical activities could greatly enhance our understanding.*

Moderator:

- *I believe it is important to address topics **related to survival and practical skills.** Considering areas like ports, transportation, goods, and logistics could provide valuable insights into real-world applications. We should explore these subjects to better equip ourselves for the challenges that lie ahead.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *In my opinion**, survival skills vary greatly depending on the culture and environment.** In certain regions, where natural disasters occur frequently, people are prepared with stockpiled food and resources. Their ability to sustain themselves during challenging times is admirable.*

Moderator 1:

- *In concluding our discussion, I would like to encourage anyone to bring up any additional points or ideas that may have been overlooked. We have a few minutes left to address any remaining topics or concerns:*
- *Thank you very much if you can share some materials about that just before the next session. This way, with the Padlet, more than what is already done, and maybe we are able to present and elaborate together on that.*

Image Appendix 6 Padlet UAntwerp CoP

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Actions

#	Date	Description	Person/institution in charge

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1	28th june	3rd session 4pm

Session n#3

3rd session
28 June 2023
16:00-17:00 (EEST)

Table 31 Agenda_session #3 UAntwerp CoP

#	Hour	Activity
1	16:00 - 16:02	**Welcome to the REFOCUS Community of Practice #2 | 2 min**
2	16:02 - 16:10	**Sharing the main topics from CoP#1 (Padlet) | 8 min**
3	16:10 - 16:40	**Developing focused contributions on these topics (Padlet) | 30 min**
4	16:40 - 16:55	**Discussion on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) | 15 min**
5	16:55 - 17:00	**Wrap-up and next steps | 5 min**

Table 32 Participants_session #3 UAntwerp CoP

#	Stakeholder	Target stakeholders
1	TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics	Educator
2	RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics	Educator
3	EH_Professor the University of Antwerp _ Transport and regional economics	Educator
4	WS_Student 18-22 y.o _ University of Antwerp	Student 18-22 y.o
7	VC_Post-Doctoral Researcher from the University of Antwerp from the University of Antwerp	Student 22-25 y.o
9	MD_NGO_ Flemish Natural Climate Federation	Organisation
10	Moderator 1 CambiaMO	
11	Moderator 2 CambiaMO	

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12	Moderator 3 Andaira	

Moderator 1:

- *You might remember this gathering of people who were sharing a common interest, and who developed knowledge and learned about this common interest together collectively. This is what we have been trying to do since our first session. We have been organizing these communities of practice in different locations as part of the Erasmus Plus project on higher education. We have already completed the second session in Madrid, Spain, and now we need to plan and organize the third session in Delta, Netherlands.*
- *So, we want to take your ideas and put them into the context of a training program. We aim to propose improvements for existing courses or suggest new courses. To achieve this, we have been working on your ideas and have compiled them in a table that forms the basis of our proposal. You may recall expressing your views in the past, and we have gathered and incorporated them into this table.*
- *summarize what was discussed last session.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *Well, I believe that the **in-person method** is the way to go for a short course. It seems reasonable. As for the target groups, I think we have already defined them in the project. So, as the foundation for the course, I would focus on university students as the core target audience. Additional groups, such as A+ students and others, can be included as supplementary to the core group of students.*

EH_Professor the University of Antwerp _ Transport and regional economics:

- *I think I would see it more at **the master's level** because we can all be involved and evolve together. From a practical point of view, it becomes a bit easier because we don't focus as much on the bachelor's level, especially when it comes to topics like transport. If transport is also a significant aspect, it could be a separate master's program responsible for it.*
- *I believe we already cover many of these topics in the courses we currently teach. It's a matter of restructuring them to align with this program. Regarding the 16 hours, the question is whether they should be taught in one week or spread over a longer period. I don't have the answer to that yet.*

Moderator 1:

- *So, if there are already existing courses, it's possible that this course could fit as a complement to them, as you mentioned. Instead of being a standalone course, it could enhance and complement the existing ones. I'm not sure yet, but it seems like a plausible approach to have a separate but complementary course.*
- *And another question that arises is regarding the 16 hours. Apart from addressing the question you mentioned earlier, we also need to clarify whether these hours will be dedicated solely to lecture-style sessions or if there will be practical components included as well.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics:

- *Indeed, in the project, the focus was on each group defining and setting up a course. In our case, it was about Sports 2.0, if I remember correctly. It can be considered as the port of the future. As Edwin mentioned, we already have a dedicated two-week course on Port Economics and Business where we address many of these issues implicitly. Sustainability and climate resilience are significant parts of the course. However, it would be beneficial to make these aspects **more explicit and visible**. We could consider adding one or two guest speakers specifically focused on these topics. We already have **several guest speakers and organize excursions to showcase** how these aspects are handled in ports. Making them more visible is important.*

VC_Post-Doctoral Researcher from the University of Antwerp:

- *What I also see as missing, and I believe it's possible to incorporate, is giving an assignment to students or a group of students to centralize initiatives related to this topic from the sector. Currently, companies and individuals are involved in these aspects in a more unstructured manner, and it would be beneficial to bring some structure and make it visible to everyone. This would involve **identifying best practices,***

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***exploring what the sector is doing, and understanding which types of companies are actively considering these aspects**. Similar to assessing the impact of AI, there should be a structured and objective approach to evaluating these things. I believe including this as an assignment for students can be a valuable part of the course.*

Moderator 1:

- *it's nice that it's something that students can develop through their own assignments, either individually or in groups.*

NGO flemish Natural Climate Federation:

- *I think the **legal framework is really important** because there is a lot of legislation coming. It's very important to highlight how this framework will be translated into practice within organizations.*
- *I personally believe that **real-life knowledge is crucial**. I feel that there are good practices, especially in sustainability, already existing in the sector and there will be more in the future. These practices can be shared with students soon. However, I think that these speakers, who are already in the classes giving lectures, could emphasize this aspect more.*
- *Regarding methods, I completely agree with the previous discussion. Information sharing is important, but it's also necessary to capture that information. The best way to do so is by working with it and practicing. Therefore, I would include this approach as well.*

Moderator 1:

- *I think it would be very relevant to collect these good practices, as it is connected to what Valentine was saying about students working on projects that gather these practices. These practices could also come from guest speakers who share their experiences and practical views on how things are being applied in the real world.*
- *Additionally, there's something that just came to my mind, which was discussed in previous communities of practice. I'm not sure if I can properly translate it into English, but it was about organizing "nature work throughs." These are immersive experiences in nature that could help us not only enjoy nature but also get closer to our goal of protecting it. It could also help us understand the effects of climate change.*
- *So, do you think this kind of practical experience would also make sense?*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *I think that the in the ports themselves there are some very nice nature areas which as you're visiting the port you see them and if I don't know if in our course specifically there is a the excursion is included and going to the port you pause them the question is whether they are pointed out or not and that's easy to do.*

NGO flemish Natural Climate Federation:

- *A field trip can be interesting, but it becomes even more valuable when **both good practices and bad practices are shown.** For example, nitrogen sticks can cause a lot of harm, so it's important to highlight the differences between these practices.*
- *However, one thing I'm considering is whether a 16-hour field trip is sufficient to achieve our objectives. I'm unsure if it's the most efficient way to reach our goals.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics:

- *I also believe that it's crucial to build a trajectory, a path that extends beyond just one course. We cannot simply address sustainability briefly and then forget about it, returning to business as usual. In a previous meeting, as per your request, I shared a document prepared by our faculty a few months ago. This document outlines a green line, indicating the consistent inclusion of sustainability throughout the program.*
- ***From the bachelor to the master level, sustainability should be prominently featured**. As Edwin mentioned earlier, at the master level, specific courses can provide a deeper exploration. However, it's important not to start from scratch or isolate these courses. Instead, we should introduce sustainability at the bachelor level, emphasizing its importance and reinforcing it through repetition.*

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- *Repetition plays a vital role in ensuring that individuals truly grasp the topic and recognize its significance. Therefore, having a red or green line that symbolizes the integration of sustainability within the syllabus and course program is of utmost importance.*

Moderator 1:

- *This also reminds me of something that was discussed in other discussions related to practical application: the importance of having a clear definition of sustainability or, at the very least, a shared understanding among everyone of what sustainability entails and how it can be accomplished.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *In terms of sustainability, I strongly believe that we should closely adhere to **the UN's definition of sustainability.** This definition essentially states that sustainable operations are conducted in a manner that does not impede the needs and resources available to future generations.*
- *For me, this core principle of not hindering the well-being of future generations is at the heart of sustainability.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics:

- *Maybe just to add to Raimonds' point, I also follow the principles outlined in the Brundtland report, which serves as the basis for sustainability. I believe it is crucial to adhere closely to the UN's definition of sustainability.*
- *The UN's definition highlights that sustainable operations should not hinder the needs and resources of future generations. For me, this principle is at the core of sustainability. Additionally, I think it is important to consider the triple bottom line, as mentioned by Thierry.*
- *The triple bottom line involves **balancing the needs of the planet, people, and profits**. While **sustainability is often associated with environmental considerations, it is equally important to take into account social and economic aspects**. We cannot focus solely on being environmentally friendly if it leads to economic decline. Similarly, an environmentally friendly transportation system might not be socially desirable if it compromises other factors.*
- *Therefore, finding the right balance and achieving an optimal point that combines these three dimensions is essential.*

Moderator 1:

- *Which types of participatory methodologies, both in a collective and individual manner, would lead to successful interventions by considering all points of view and potential consequences and implications before making decisions?*

TV_UANTWERP_Professor:

- *One specific plan we have is **to introduce a port endeavor game** in the mentioned course. This game focuses on sustainability and simulates a real-life port setting, allowing participants to understand the different stakeholders and their interests. It promotes collaboration and finding an equilibrium between the viewpoints of green NGOs, economic development, and job creation. By playing the game, participants learn to consider and understand each other's perspectives, leading to optimal solutions. This participatory methodology reflects the importance of collective decision-making and considering all points of view before making interventions.*

Moderator 1:

- *In the Greek Community of Practice, there was emphasis on both the ethical aspect, which you already mentioned in the legal framework, and human rights. It is important to consider these aspects in our discussion, as the use of technology can potentially lead to discrimination or other negative impacts on individuals.*

RA_Researcher from the University of Antwerp_ Department of Transport and Regional Economics:

- *I think it's very far and I think human rights to what, uh, what is in the ports course to me is still far.*

TV_Professor from the University of Antwerp_ Department of Transport and Regional Economics:

- *Maybe to add to that, **I strongly believe that human rights should be another crucial aspect to consider**. It primarily revolves around the well-being of individuals, and I think it should be integrated into the entire trajectory and pathway of education. Additionally, in response to Marie's point, I agree that these*

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*principles **should extend beyond the limited scope of the 16-hour port course**. They should be **ingrained in the overall ethical education of students**, encompassing not only climate-related concerns but also issues concerning people and profits.*

- *Regarding the specific port course, I don't foresee significant challenges in addressing human rights issues in ports and transportation. One example that could be explored is the potential exploitation of cheap labor. However, I don't view it as a central focus that needs to be extensively covered in such a course. Nonetheless, it is essential to raise awareness among future managers working in the industry, emphasizing the importance of **treating people with respect and fairness**, and ensuring that no forms of abuse occur.*

Moderator 1:

- *From your perspective as a student, what are your thoughts on this matter? How do you perceive the integration of sustainability, ethics, and human rights into your current educational experience? Do you believe it is relevant and motivating for you?*

WS_Student 18-22 y.o _ University of Antwerp:

- *I agree with your point. As a student, I also believe that focusing on the **three aspects of sustainability (people, planet, profit) is crucial.** While it may not be feasible to delve too deeply into all aspects of innovation and technology within a short course or program, it is important to maintain a consistent emphasis on the three pillars. This way, we can ensure a well-rounded understanding of the topic without overwhelming the scope of the course.*

Table 33 Future-oriented Curriculum UAntwerp CoP

TITLE	**Future-oriented curriculum on Sustainability, Ethics, and Human Rights**
OBJECTIVE	propose improvements for existing courses or suggest new courses related to sustainability, ethics, and human rights
TYPE	In-person short course, mostly
DURATION	discussion about whether the 16 hours should be taught in one week or spread over a longer period.
TARGET	University students, particularly at the master's level, are identified as the core target audience
DESCRIPTION	The course aims to complement existing courses by focusing on sustainability, ethics, and human rights in the port sector. It will integrate practical experiences, guest speakers, and assignments to centralize initiatives from the sector. The course will emphasize the triple bottom line approach (people, planet, profit) and adhere to the UN's definition of sustainability. It will also explore the legal framework, good practices, and the translation of sustainability into practice within organizations.
THEMATIC UNITS	May include topics such as sustainability in port operations, climate resilience, legal frameworks and regulations, good practices and case studies, ethical considerations, human rights. Identifying best practices
METHODS	Participatory methodologies will be employed, including lectures, guest speakers, practical experiences (e.g., field trips), assignments, and the use of a port endeavor game to foster collective decision-making and consider diverse viewpoints.

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UAEGEAN & ACG CoP

Session n#1

Meeting organiser: AEGEAN/CAMBIAMO/ANDAIRA
Moderator: CAMBIAMO
Note taker: ANDAIRA

1st session
10 May 2023
17:00-18:00 (EEST)

Table 34 Agenda_session #1 UAegean & ACG CoP

#	Hour (EEST)	Activity
1	17:00 - 17:05	**Welcome to the REFOCUS CoPs**
2	17:05 - 17:15	**Tour de table on motivation and expectations of participants from REFOCUS CoP**
3	17:15 - 17:25	**Warm-up / Ice breaker** (e.g. share an object)
4	17:25 - 17:30	**Group arrangement**

5	17:30 - 17:50	**Launch of key ideas, narrative of the CoP**
		● POSSIBLE QUESTIONS:
		  ● Potential incidence in teaching / your organisation - what can be changed (FOR TEACHERS/ORGANISATIONS)
		  ● … (FOR STUDENTS)
		  ● Good practices related to sustainability.
		  ● (Brainstorming about REFOCUS module)

6	17:50 - 17:55	**Wrap-up** ● TOPICS FOR FUTURE CoPs
7	17:55 - 18:00	**Closing remarks**

Table 35 Participants session #1 UAegean & ACG CoP

#	Stakeholder	Target stakeholders
1	ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics	Educator
2	ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport	Educator

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3	IK_Postdoctoral Researcher from University of the Aegean_Department of Shipping, Trade and Transport PhD in City Logistics	Educator
4	MK_PhD Candidate from University of the Aegean_Transportation and Logistics	Educator
5	VZ_Maritime ,shipping export consultant	Organisation Business representative
6	SP_Project manager in transportation & infrastructure_IBI Group	Organisation Business representative
7	YL_Maritime Manager Helmepa	Organisation NGO
8	AT_Assistant professor from the American College of Greece_ transportation/maritime economy	Educator Organisation Business representative
9	Moderator 1 CambiaMO	
10	Moderator 2 CambiaMO	
11	Moderator 3 Andaira	

(1) STACG

- Euripides Sakellariou, expert in the Logistics sector.
- Practising law for 30+ years in shipping and commercial aspects

(2) VZ

- Expert in Shipping
- Also works at Speed Aeronautical Systems (company that constructs helicopters and ground stations)

(3) SP

- IBI Group, expert in Transport sector
- Works as a project manager in the transportation and infrastructure field (with Arcadis IBI Group)
- Surveyor engineer from the National Technical University of Athens

(4) ML

- Engineer (started with mechanical)
- Took a PhD in electrical engineering
- Scientist Researcher

(5) YL

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- Works at an NGO: safety on board, digitalization, decarbonization, the whole aspects of shipping and welfare; environmental sustainability awareness

(6) IK
- Civil engineering background. Transportation engineer
- Adjunct Lecturer - Postdoctoral Researcher (AEgean)
- Transport and logistics

(7) MC
- Civil engineering background
- Master's degree (transport engineering) in the Technical University of Munich
- PhD Candidate, Traffic, Transportation and Logistics

(8) AT
- Assistant professor at the American College of Greece

I. Warm-up

Moderator 1
Explains the rules of CoP:

a. Objectives
- Expectations about sharing some knowledge, about raising awareness of the environmental and climate change impacts of transport, shipping and logistics.
- Understand which kind of strategy we can use for dealing with the challenge of climate change.
- Teaching aspects: see how to reorient this new training material on sustainability and climate resilience for transport shipping.
- Understand what is a community of practice (CoP): It's a workshop? It's a focus group? The need of a community of learning by practices, putting together different knowledge.

II) Launch of key ideas, narrative of the CoP

Moderator 1
- *What are the needs and the expertise that you are looking for? And on the other hand, for the professors and the research personnel, what are you doing already for the climate change and sustainability that is already included in your courses? What do you feel that it's still not covered?*

VZ_ Working at Spirit World Group
- Important engagement with the social media, with portable devices and digital products
- We are looking to see if the young people can win the customer's trust and loyalty. Things are *changing very quickly, it's not like in my time, that we had changed every five or ten years. Now everything is too accessible and available.*
- *In terms of the climate change concern, my work depends on the position: if they are in sales, yes, we expect to have some results, and depends on if they have experience and if they're coming for the first job.*

SP_ Project manager in transportation & infrastructure_IBI Group
- *There are usually two paths when you enter a big corporation: you either follow a technical path or you tend more to the managerial aspect.*
- *Nowadays the young professionals have 2 or 3 degrees and so they are willing to learn and train people and learn about new technologies and stuff.*
- *On the other hand, especially in the Greek market there's a huge lack of skills, interpersonal skills and ethical-driven skills.*

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- *Key requirements in job positions related to the ESG (Environmental, Social and Governance) factors: for example, how do you see a sustainable design, how do you define a sustainable design*

Moderator1

- *What would you like to suggest to the market or the university?*

ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics

- *We are just focusing a lot on ESG aspects: we hired 2 specialist's doctors in order to create curricula specially designed for the maritime industry.*
- *Even though in Greece it's going to take a little bit more time to implement the ESG, shipping is quickly changing, the charters are demanding more, and so Greek ownership is taking fast steps.*
- *I don't think that the Greek maritime industry is ready for ESG, but we made some surveys in order to create our curricular arithmetic for the annuals training program and we were wrong, we've seen a lot of huge interest, that's why we created the ESG Helmepa*
- ***It's important to know that ESG it's not only a course. Everything is under the umbrella of ESG**: claims, pollution, accident prevention, safety, etc. It's environmental, society and governance, so that's why I think, and you will see in the next five years that this is going to be a mandatory course for everybody.*

Moderator1

- *What are you offering already for students who are coming to you, if you already have something in your curricula?*

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport

- *It's a hot topic for everyone. **Professors publicize thesis of these topics**. They struggle to get funding for research projects dealing and refined aspects about the environment, for alternative fuels, automation in various kinds of models of transportation, new frameworks to revise and formulate related policies and so on. It's an area we are **heavily involved in.***
- *In the university we are preparing the next generation for this. My understanding is that in terms of real jobs, the **Greek shipping companies do not have that many openings regarding** for example chemical engineers to work in project with environmental issues. I do see that people in every department in the maritime companies are already familiarising themselves with these topics, so you get formal education on that, one way or another.*

ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics

- ***We (Greeks) are not very up to dated yet**. I also understand that progressively and continuously in the shipping industry **demands sustainability awareness**. And our theory and in my courses, the program and the shipping management and the logistics program, there are a few courses that have sustainability aspects. I think we are preparing a whole mine of sustainability, but I also understand that what is basically missing from **today's students is the real awareness of sustainability goals.***
- *From the legislative point of view, the UK have created a bulk of legislation of its national legislation covering huge topics.*
- *Again, I think that young **professionals and students need to become much more aware of how important sustainability is.***

AT_Assistant professor at the ACG/Works in transportation/maritime economy

- *We try to implement sustainability in several courses especially in the shipping related ones as well as in logistics to be honest. But I agree with the awareness and truly understand what sustainability entails the ESG's and **I don't think that students still capture this.***

Moderator 1

- *From the student point of view…*

SP_ Project manager in transportation & infrastructure_IBI Group

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- *The sustainability part was not so strongly mentioned throughout the course to be honest, perhaps because it's an MBA degree. I really would like to see more topics about sustainability, as well as digital transformation*.

YL_Maritime Manager

- *Maritime industry, as any other industry does what they must do, they're market oriented, market based or legislative. ESG is approaching in both ways for them. So one thing that makes the Greek shipping community successful is that they prepare the past to be on the right side of the profit and business.*
- ***Markets and legislation are forcing the shipping industry to be aware**, that's why they are the first movers in Greece. I think we are reaching the states of awareness, we're approaching fast. In that sense, we have a large database to get the info from.*
- *The bottom line is that the maritime industry is being forced to blight, but the city and a lot of people are loving what they are doing. Protecting the seas.*

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport

- *I think that the awareness that the colleague mentioned earlier is not that low anymore: **students are aware about the concepts and approaches and frameworks regarding environmental issues**. At least our finance and environment technology that our colleagues are introducing every day to them (in terms of techniques and notions).*
- *Until now, the discussion was a bit biassed. We were trying to prove how bad the Greek companies were regarding climate issues, and now I think we are getting more and more fair basis, so in our programs we **cautiously bring people from companies and shipping companies to present their views and their particular products and management.***
- *We have to keep this warm enthusiasm of students coming and wanting to work in this industry. This is national pride, so we need a fair basis for the discussion.*

SP_ Project manager in transportation & infrastructure_IBI Group

- *I think the changing point for the Greek market to **start heavily investing in sustainability is actually the public, the government pushing towards this strategy and direction**. For example, in the infrastructure sector like transport, if we take a public procurement process, we can see there are some reward criteria that include technical qualifications and financial qualifications. Imagine if all the tenders that we can see now in the future, **they start having sustainability as a reward, actually as an award criteria.** Then this will attract universities to push more towards this direction, companies, etc. This is happening in the UK or countries in North America and so on.*

VZ_Maritime ,shipping export consultant

- ***We don't have any instructions yet about sustainability that we have to follow**, we don't even have instructions for the maritime single window that other countries have already started two years ago, and we don't have. We don't even have the announcement to do the same.*

ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics

- *I do know now that for example in shipping banks link the interest rate with value sustainability levels of the financed companies. I think the government will do that if the market demands that. So it's basically both ways.*

**** END OF THE TOPIC****

- Possible topics for future discussions or considerations based on the meeting:

1. Enhancing sustainability education in MBA programs and other relevant courses.
2. Integrating topics of digital transformation and sustainability into the curriculum.
3. Exploring the role of market forces and legislation in driving sustainability practices (for example in the maritime industry)

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4. Identifying opportunities for collaboration between universities and companies in promoting sustainability awareness.
5. Discussing the importance of public and government support in driving sustainability strategies and initiatives.

Actions

#	Date	Description	Person/institution in charge
1	31 may	2nd session 5pm (GR)	CambiaMO/Andaira

Session n#2

2nd session
31 May 2023
17:00-18:00 (EEST)

Table 36 Agenda_session #2 UAegean & ACG CoP

#	Hour (EEST)	Activity
1	17:00 - 17:02	**Welcome to the REFOCUS Community of Practice #2 | 2 min**
2	17:02 - 17:10	**Sharing the main topics from CoP#1 (Padlet) | 8 min**
3	17:10 - 17:40	**Developing focused contributions on these topics (Padlet) | 30 min**
4	17:40 - 17:55	**Discussion on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) | 15 min**
5	17:55 - 18:00	**Wrap-up and next steps | 5 min**

Table 37 Participants session #2 UAegean & ACG CoP

#	Stakeholder	Target stakeholders
1	ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics	Educator
2	ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport	Educator
3	IK_Postdoctoral Researcher from University of the Aegean_Department of Shipping, Trade and Transport PhD in City Logistics	Educator

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4	MK_PhD Candidate from University of the Aegean_Transportation and Logistics	Educator
5	VZ_Maritime ,shipping export consultant	Organisation Business representative
6	SP_Project manager in transportation & infrastructure_IBI Group	Organisation Business representative
7	EV_Assistant professor from the American College of Greece_ transportation/maritime economy	Educator Organisation Business representative
8	AM_Graduate_student_Shipping_Management	Student 18-22 y.o
9	DS_Postgraduate in management	Student 22-25 y.o
10	Moderator 1 CambiaMO	
11	Moderator 2 CambiaMO	
12	Moderator 3 Andaira	

I.Contents of today's meeting:

1. Welcome to the REFOCUS Community of Practice #2 | 2 min
2. Sharing the main topics from CoP#1 (Padlet) | 8 min
3. Developing focused contributions on these topics (Padlet) | 30 min
4. Discussion on best teaching practices and needs, existing programs (content, duration, locations, fees, etc.) | 15 min
5. Wrap-up and next steps | 5 min

Moderator 2 welcomes and explains the objectives:

- *So, the purpose of today's meeting is to share the main topics that emerged from our previous Community of Practice session. We'll use a tool called Padlet to visualise these topics and allow you to provide your ideas through positive posts related to each topic or section. We encourage you to propose new topics if you feel any important ones were missed during the discussions. Afterward, we'll have time to further develop these topics by sharing individual ideas from different perspectives, such as civil society, students, NGOs, universities, and the industry.*
- *We'll explain how to contribute your ideas and then engage in an open discussion where you can elaborate on your thoughts. Particularly, we are interested in hearing your ideas on how to improve the current education system".*

II. Padlet Introduction

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1. Mismatch between ambition of workers in sustainability and labour market demand
- Civil society (students, NGO representatives)
- University (Professors, researchers)
- Labour Market

2. Shipping regulation is lagging behind global climate change requirements
- Civil society (students, NGO representatives)
- University (Professors, researchers)
- Labour Market

3. Two main social actors leading the change: NGO and universities
- Civil society (students, NGO representatives)
- University (Professors, researchers)
- Labour Market

ML_AEGEAN:

- Expresses concerns about how the identified topics were formulated during the previous session. They specifically question the existence of a Greek national regulation.
- *During our discussion, I realised that there might not be a specific Greek national regulation. Instead, the emphasis should be on regulations and legislation concerning saving in general. So, it would be* ***more appropriate to address the topic as "regulations and legislation" rather than "Greek regulations".***

Moderator 2:

- *So you see again here which actors are represented in each of the subgroups, and then what you need to do is to click on the plus button. Here, you can add a title to your post, develop your idea, and then click here to switch between different colours. You can choose the colour that represents your group. If you encounter any problems, please let us know. You can also use the chat function or propose ideas orally.*
- *Now, let's begin by giving you approximately* ***7 to 10 minutes to work individually*** *on the checklist and reflect on how you think education and training can improve. Specifically, consider how we can nourish the future or integrate sustainability and climate resilience into the curriculum.*

***After 10 minutes**:

DS_Postgraduate in management:

- *One of the key challenges in the banking sector is the presence of mountain risks. This applies not only to European banks but also to banks worldwide. However, I believe that the most significant aspect lies in our society and global governance.*
- ***It is crucial for our world to prioritize Environmental Social Government*** *(ESG) factors in all aspects of life. This includes the* ***active participation of governments and individuals*** *in environmental stewardship and governance.*
- *I strongly believe that a better future awaits us. In my research, I explore various topics related to sustainability. Integration is a central and comprehensive concept in this context.*
- *The private sector, for instance, utilises measures to assess confidence in sustainability. Environmental concerns are prevalent worldwide. We observe changes such as unpredictable weather patterns, increased rainfall, and a growing emphasis on clean energy and technologies. The issue of greenhouse gas emissions is particularly relevant.*
- *For instance, in Greece, methane emissions have been effectively reduced through specific measures. Furthermore,* ***social issues, labour relationships, working conditions, and human rights are all essential considerations.***
- *What I need foremost is the engagement and collaboration of the people that are here*

Moderator 1 (in response to the student):

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- *This is a very key point actually in the community of practice that we had in Madrid. There was this aspect more on **gender and climate change and ecofeminism**, and this shows a shift towards taking care of the planet. And in this dimension as well, like you said, **human rights.***
- *In this discussion, we realised the need to add more. Yeah, we should include some courses on that, for example. **Maybe there are human rights courses for people studying legal studies, but not for engineering students.***

ML_AEGEAN: (regarding to what moderator 1 says):

- *I think that's a very valid point, the one that you just raised. **Introducing courses that focus on legal and policy matters, as well as legislation and regulation, is crucial**. It shouldn't be limited to management schools; **it should also be emphasised in engineering schools.** This would help advance awareness among students and young professionals in the field of sustainability.*

ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics:

- *I fully agree with ML_AEGEAN. The point I made earlier is that local regulations are lagging behind international legislation, especially in the identified topic. **Introducing new courses on legislation and climate-related sustainability goals is essential.** However, I would also suggest that it should not be limited to specific areas. Some major topics related to international legislation about sustainability could be integrated into existing courses. I also agree with Maria that these aspects should be taught in all relevant areas.*

Moderator 1 (in response to ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics):

- *OK, and just to go a little bit further on that, how can it be done from a management point of view or an engineering point of view?*

ST_Professor from the American Collage of Greece_ Maritime, Transport and Logistics:

- *I have an idea on this. For example, in engineering, especially in international standards, either from classification societies or the IMO.*
- *And now, regulations from these bodies are **becoming an integral part of engineering oversight** and that aligns with the advancements in technology. So these aspects could be integrated there as well, at least the main points of these regulations.*

ML_AEGEAN:

- *Stravos improved my point on regulation and legislation, which has been a longstanding issue in the university. Integrated courses play a crucial role in exposing engineering and management students to sustainability. However, **there is a significant mismatch between the ambition of sustainability-driven workers and the current demands of the labour market.** Despite this, I believe that with creative thinking and further contributions, we can bridge the gap. It is essential to acknowledge that there are leading companies that have made significant strides in sustainability, and our goal is to educate students to collaborate with them in shaping policies and technologies. While we have dedicated professors and knowledgeable students, it remains a challenge to have more companies leading the way towards a sustainable future.*

SP_ Project manager in transportation & infrastructure:

- *Definitely, I agree that currently many professionals have concerns regarding sustainability and the demand compared to supply. To address these issues, companies can take several steps. Firstly, **they should create more jobs with a specific focus on sustainability requirements.** This would be a significant move to meet the future needs of clients, especially considering that the Greek market is catching up.*
- *Additionally, **they can leverage the skills and abilities of their existing resources by providing ongoing training and skill enhancement.** This approach is not only easy but also cost-effective.*

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- *If hiring more personnel is not an option, companies can still make a difference by raising awareness and taking the lead in various initiatives. This can be seen as an update to their **corporate social responsibility program**.*
- *Lastly, updating relevant policies and regulations at the global level is crucial to aligning with sustainability practices and goals.*

VZ_Maritime ,shipping export consultant:

- *Because of our last meeting, I tried to ask people around, mainly my colleagues, if they are aware of sustainability and if they are taking any actions. **Surprisingly, nobody seems to be doing anything or even have any instructions to follow.***
- *They have some knowledge about decarbonization, but they are completely unaware of important deadlines, like the one coming up on January 1st, 2024.*
- ***We haven't received any instructions on how to enter the system**, except for Egypt, which seems to be following the system but still faces difficulties in using it, such as logging into the platform.*
- *The platform itself is great because it streamlines the process and makes it faster, but unfortunately, nobody is using it except for Egypt. Additionally, **we lack awareness and understanding of what sustainability truly means.***
- *Moreover, the lack of education on this subject is a concern. While some of us have faced this issue for a long time, there are others who are **not currently up to date.***
- *Therefore, **I believe that universities and our former colleagues should organise seminars or workshops to inform all of us who are working in this sector.** It's important for us to be **well-informed.***

Moderator 1 (in response to previous comment):

- *Actually, there was quite a request from somebody in the COP of Madrid for feedback and training.*
- *So, **in terms of continuing training**, your original university may contact you and offer relevant courses. They might say, "Look, we offer these courses that are quite relevant to your job. Would you like to participate?" As an older student, this opportunity can be beneficial for both you and your job. I believe it's important to keep this in mind, considering the commonality with the CoP in Madrid.*

***Ideas for further discussion or development**:

1. Exploring the role of international regulations and legislation in promoting sustainability.
2. Bridging the gap between the ambition of sustainability-driven workers and the current demands of the labour market.
3. Addressing concerns about sustainability in the professional workforce and ensuring awareness and actions are taken.

#	Date	Description	Person/institution in charge
1	June 26	3rd session	CambiaMO/Andaira

Image Appendix 7 Padlet UAegean & ACG CoP

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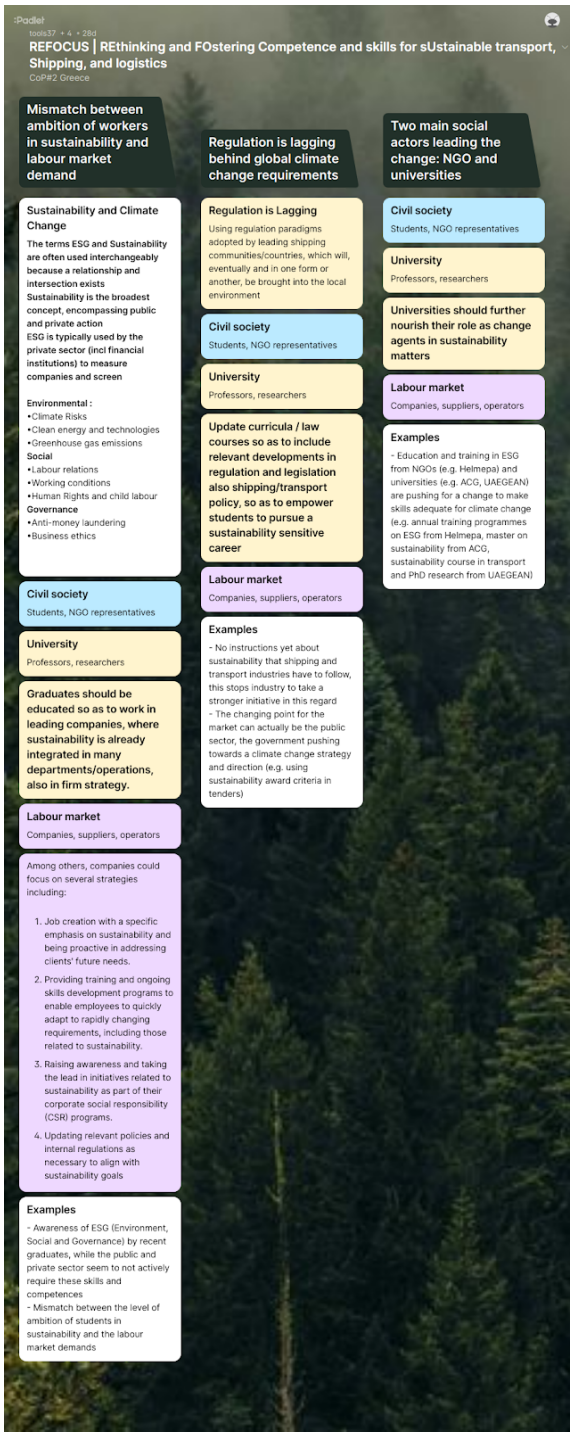

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Session n#3

3rd session
26 June 2023
16:30-17:30 (EEST)

Table 38 Agenda_ session #3 UAegean & ACG CoP

#	Hour (EEST)	Activity
1	16:30 - 16:32	**Welcome to the REFOCUS Community of Practice #3 | 2 min**
2	16:32 - 16:37	**Sharing the main outcomes from CoP#2 | 5 min**
3	16:37 - 17:27	**Developing specific proposal on future-oriented curriculum | 50 min**
5	17:27 - 17:30	**Wrap-up and next steps | 5 min**

Table 39 Participants session #3 UAegean & ACG CoP

#	Stakeholder	Target stakeholders
1	ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport	Educator
2	MK_PhD Candidate from University of the Aegean_Transportation and Logistics	Educator
3	VZ_Maritime ,shipping export consultant	Organisation Business representative
4	AM_Graduate Student:UAEGEAN_ Shipping_Managment	Student
5	SP_Transportation Planner European_Comission	Organisation European organisation
6	Moderator 1 CambiaMO	
7	Moderator 2 CambiaMO	
8	Moderator 3 Andaira	

Moderator 1

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- *Just to update and repeat, I don't know how much you know about this project or this community of practice, but this is the third one, and let me explain what we did.*
- *Our goal was to co-create knowledge in order to develop curricula for either an engineering school or an economic school, depending on the location. Today, we can discuss what we would like to do next. We have already prepared a Canva with a table outlining the possible objectives, contents, and slides. We would like to work with you to complete this table, specifically focusing on the contents of the course related to sustainability and climate change awareness.*

Moderator 1 (presenting the future-oriented curriculum on sustainability and climate resilience for transport, shipping and logistics)

- *We have put together a description of the main aspects we will cover, which include awareness and understanding of what sustainability truly means, social issues, labor relationships, working conditions, and human rights. These are important topics that were significantly presented within the legal and policy scope, including legislation and regulations related to climate and sustainability goals.*
- *We propose incorporating certain units that are related to environmental, social, and governance factors for a sustainable future.* ***Integration is a central concept in promoting sustainability, with legislation and regulation focusing on sustainability goals.***
- *We also propose discussing methods for the development of each topic. For example, we can explore how these topics can be provided by private sectors or NGOs. In fact, some NGOs are already offering courses on SDGs (Sustainable Development Goals).*

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport

- *In REFOCUS, we develop specific courses that constitute our own curriculum, consisting of six distinct courses. Today, in this third session of the community of practice, we aim to conduct a similar exercise.*
- *Let's consider a scenario where we are asked to build a curriculum. You propose a particular course, not the entire curriculum, and you invite us as participants of this group to reflect on how we would envision its optimal development. Is my understanding correct?*

Moderator 1

- *Yes, the objective is to provide a more comprehensive understanding of the skills required by the market or NGOs, going beyond what universities typically offer. Furthermore, we have noticed an increasing demand from students for additional information.*
- *We acknowledge a heightened appreciation for the value of sustainability and climate change awareness in various job positions. Therefore, our intention is to propose concrete content that addresses these specific areas.*

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport

- *If I may start, let's consider the first pass. We need to determine whether it's possible to include such a course in a postgraduate or undergraduate program.*
- *For students of business administration and shipping administration, this could be an option. We can devise a future-oriented course on sustainability and climate resilience that* ***can be integrated into various existing courses.***
- *One feasible, legitimate, efficient, and desirable option is to have a* ***self-contained course.*** *The title could be "Sustainability and Climate Resilience for Transport, Shipping, and Logistics." It could consist of 13 modules covering technical, managerial, legal, and policy aspects. Additionally, a more practical approach would be to include a smaller or lighter option, with fewer lectures* ***focusing on the formal aspects of sustainability and SDGs or ESG aspects.*** *These options are workable, feasible, and desirable.*
- *I see the need for a standalone course in curricula where it currently doesn't exist. However, I also envision the possibility of* ***incorporating more elaborate lectures into existing course****s. For example, we already have a representative case in a postgraduate course where we cover environmental technologies and policy aspects. This is something that both the market and students demand in postgraduate degree programs.*

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Moderator 1 leaves the reunion and Moderator 2 starts to moderate the meeting

Moderator 2
If any of you would like to comment on these contents…

AM_Graduate_DD_Stu_Shipping_Managment

- *I mean, I remember part of it. I recall that we were discussing including some courses that are more focused on sustainability in the course syllabus. Or perhaps not only adding new courses about sustainability but also* ***incorporating chapters about sustainability into the existing ones.*** *I believe that's what was being discussed when I left the meeting.*

Moderator 2 (summarizing the last session):

For example, one issue that was very prominent in the previous discussion was about legislation and regulation increasing awareness about sustainability development goals, specifically those related to climate. This is why we described the course with these main topics.

- *One group of topics is precisely focused on legislation and regulation. The other topics cover areas such as defining the true meaning of sustainability, including its various dimensions beyond just environmental sustainability. It's important to have a common understanding of what sustainability encompasses. Additionally, we want to address social matters, including relationships, working conditions, and human rights.*
- *Now, we would like to know your thoughts. Does this course reflect your needs and ideas based on the discussions from the previous sessions? Would you like to propose anything in addition to these topics? Your input is essential in reviewing the things we discussed and shaping the course content.*

AM_Graduate_DD_Stu_Shipping_Managment:

- *No, I mean it covers everything. Considering my academic years and my current job,* ***sustainability has multiple dimensions.*** *Specifically, as far as I know, it encompasses* ***three basic dimensions: environment, economy, and ethics.***
- *Definitely, I would suggest* ***in-person courses****. Well, I can say that it did. I was fortunate enough to experience both in-person and online courses due to the COVID pandemic.*
- *I studied for five years, and the last two years were completely online. Therefore, I had the opportunity to see both sides. In my opinion, in-person courses leave a better impression because they offer more interactive experiences, making it easier for students to remember and engage with the content. As for the duration, I'm not entirely sure if there should be a specific number of hours.*
- *I believe* ***16 hours would be sufficient****, but going beyond that might not be the target. It would be better to introduce the course* ***in the third year*** *rather than the first or second year. In my experience, during the first and second years, students establish a foundational knowledge of the subject. Then, in the third and fourth years, they are better equipped to delve deeper into the topic.*

VZ_Maritime ,shipping export consultant

- *I wanted to mention that my son attended the first class of gymnasium at the ACG. They had an introduction to ESG, and he also took a test on that topic. I find it very important that at this age, they are aware of and learn about ESG. It's better to start* ***at an early age because as they grow up, they develop a mindset that values the positive aspects brought by ESG****. Although they may not delve deeply into the subject at this stage, they can gradually increase their understanding and knowledge each year. My son is currently 13 years old.*

SE_Univ_EGM_&_European_Comission

- *What we should acknowledge here is that* ***sustainability is a term that is often used but can be quite vague across various sectors****. The transport sector, in particular, is greatly impacted, and we frequently use this terminology without a clear understanding of its true meaning. It is essential for all of us to delve deeper into sustainability,* ***develop a solid knowledge base, and establish a new approach for its implementation.***
- *Furthermore, we should consider engaging in activities that disseminate and exploit finalized projects within the sustainability context. This would help accelerate progress and provide a broader framework*

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for people to better comprehend the implications and hidden aspects associated with this seemingly simple word.

- *And also, it would be beneficial **to incorporate practical knowledge and hands-on experience into the training, rather than solely relying on theoretical instruction**. I'm wondering if it would be possible **to involve practitioners who have actual experience in sustainability.** They could **give lectures, participate in sector-specific campaigns, conduct seminars, workshops**. By including these experts from our field, we can further enhance our understanding of sustainability.*
- *Additionally, it's important to emphasize and **learn from past good practices in the field.** By highlighting successful examples from the past, we can gain valuable insights and apply them to our current efforts.*

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport

- *We need to revisit and comment on the options available for formulating and implementing courses.*
- *Firstly, an option that we haven't sufficiently addressed is to incorporate sustainability aspects in greater detail within existing courses. For example, **in finance courses,** there is ample opportunity to focus and elaborate on what finance professionals refer to as sustainable finance. This would involve encouraging companies to **proactively implement sustainability principles, governance, technologies, and other measures in their operations.***
- *Secondly, **the approach may vary depending on whether you are part of an engineering department or a business department**. In an engineering department, there is a greater scope to delve into topics such as alternative fuels, new energy systems for ships, and cutting-edge technologies, which are being explored in engineering research to advance sustainability. Both the management and engineering strands have made significant progress in these areas.*
- *However, it becomes challenging to provide sufficient depth and maintain a uniform format in a standalone course that covers all aspects adequately. **Teaching the same course in a naval engineering department and a shipping management department would require different levels of detail and focus**. Therefore, when designing a curriculum for undergraduate or postgraduate programs, it is crucial to consider the specific details and target audience carefully.*

AM_Graduate_DD_Stu_Shipping_Managment:

- *I would like to add something to the point about the subject and the courses. From my personal experience, when I was in my third year of studies, I had little understanding of what sustainability meant. However, I had the opportunity to take two logistics courses that incorporated sustainability projects. These projects required us **to be creative and design transportation modes that were environmentally sustainable, considering factors like air pollution.** Many students came up with innovative ideas, such as solar-powered ships or vehicles using alternative fuel sources. **This approach helped us grasp the concept of sustainability, not only from an environmental perspective but also from an economic standpoint.** I believe it would be beneficial to include similar projects in courses, allowing students to explore academic sources and support their ideas with research. **Workshops or individual and group projects focused on sustainability could be a valuable addition to the curriculum.***

ML_Professor from University of the Aegean_Department of Shipping, Trade and Transport:

- *I would like to reiterate the point that the social aspects of sustainability seem to be the most challenging and ambiguous. As Aphrodite mentioned, there is a long-standing tradition of corporate social responsibility (CSR), and professionals are generally aware of its importance. However, it is crucial for young people to also become familiar with these social aspects as they will soon be actively engaged in the field. The triad of sustainability encompasses not only the environment and economics but also **the social dimension, including the concept of a "license to operate" that companies and organizations must uphold.***
- *At present, it seems that there is a lack of an updated framework specifically addressing social aspects. It should not become just another managerial framework; rather, it requires ongoing development and attention. This area is open-ended, with both far-reaching consequences and ample room for further exploration and improvement.*

Moderator 2 (wrapping up):

- *We would like to highlight some additional points that emerged from our previous discussion. These ideas may not directly fit into a university course or training program, but they are still worth considering. Firstly,*

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it is important to explore the broader role of regulations in promoting sustainability. Regulations can go beyond the educational perspective and help bridge the gap between demand and supply in sustainable practices.

- *Furthermore, there is a need **to address the mismatch between labor market demands and the skills provided by educational institutions.** Companies should play a more active role in bridging this gap and ensuring that the workforce is adequately prepared for sustainability-related challenges.*
- *One important aspect raised was the need **to improve sustainability awareness among professionals.** It is crucial to take action and enhance their understanding of sustainability principles and practices. Although these concerns may not directly fit into a curriculum focused on specific features, they should not be ignored as they contribute to a well-rounded approach to sustainability education.*

In conclusion: The discussions revolved around the importance of incorporating sustainability into the course syllabus, specifically in relation to legislation and regulation, the true meaning of sustainability, and social aspects. Participants emphasized the need for a common understanding of sustainability's multiple dimensions, including environment, economy, and ethics. The suggestion of in-person courses was made to provide more interactive experiences for students. The timings of introducing the course in the third year was recommended to build on foundational Knowledge. Develop a solid knowledge base and establish a new approach for sustainability implementation.
Starting sustainability education at an early age was also considered valuable. Practical knowledge and involvement of industry practitioners were suggested for a more comprehensive understanding. Learning from the past successful practices and incorporating sustainability aspects into existing courses were proposed as options. The challenges and importance of addressing social aspects of sustainability, such a corporate social responsibility, were emphasized, with the recognition that the area requires ongoing development and attention. Specifically, recommendation to develop a sustainability approach in finance courses to proactively implement sustainability principles, governance, technologies, and other measures in their operations.
Teaching the same course in a naval engineering department and a shipping management department would require different levels of detail and focus.
Additionally, incorporating sustainability projects and workshops into the curriculum was seen as a beneficial way for students to engage with sustainability concepts and develop innovative ideas and solutions.

Table 40 Future-oriented Curriculum UAEgean & ACG CoP

TITLE	**Future-oriented curriculum on sustainability and climate resilience for transport, shipping and logistics**
OBJECTIVE	Provide a comprehensive understanding of the skills required by the market or NGOs, going beyond what universities typically offer. The aim is to propose concrete content that addresses sustainability and climate change awareness in the areas of transport, shipping, and logistics.
TYPE	It can be inferred that there is a preference for in-person courses due to their interactive nature and potential for better engagement.
DURATION	A suggestion is made for a standalone course titled "Sustainability and Climate Resilience for Transport, Shipping, and Logistics" consisting of 13 modules. The specific number of hours is not mentioned, but it is suggested that the course could be introduced in the third year of study.
TARGET	The target audience for the course includes students of business administration and shipping administration, as well as professionals in the transport, shipping, and logistics sectors.
DESCRIPTION	**Main aspects to cover:** • Awareness and understanding of the comprehensive meaning of sustainability, including its environmental, economic, and social/ethical dimensions. • Social issues, including labor relationships, working conditions, and human rights.

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	• Legal and policy matters, including legislation and regulation, particularly those related to climate and sustainability goals.
THEMATIC UNITS	**1. Environmental Social Governance (ESG) factors for a sustainable future** a. Governments and individuals must actively participate in environmental stewardship and governance. b. Integration as a central concept in promoting sustainability. c. The private sector's role in assessing sustainability measures, addressing environmental concerns, and fostering engagement and collaboration. d. Legislation and regulation focusing on sustainability goals. e. Integration of key sustainability topics into existing courses in management and engineering schools, ensuring alignment with local and international regulations.
METHODS	To enhance knowledge on sustainability and share good practices, involving NGO or private representatives, such as through campaigns, seminars, and lectures, can be beneficial. Organizing workshops and seminars would also facilitate learning and collaboration. Developing individual or group projects on sustainability would provide students with practical application and the opportunity to research and justify their ideas. This hands-on approach can deepen understanding and engagement with sustainability principles. In terms of fitting the proposed curriculum, it could be integrated into existing courses across various disciplines, depending on the specific focus and content. However, considering the comprehensive nature of sustainability, a standalone course dedicated to sustainability could also be considered to provide a more in-depth exploration of the subject.

Actions

#	Date	Description	Person/institution in charge
1	To define	international CoP	CambiaMO/Andaira

TU Delft Cop

Session n#1

Meeting organiser: UAEGEAN/CAMBIAMO

Moderator: CAMBIAMO

Note taker: ANDAIRA

1st session
16 june 2023
14:00-15:00 (EEST)

Table 41 Agenda_session #1 TU Delft CoP

	Hour	Activity

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14:00 - 14:05	**Welcome to the REFOCUS CoPs**
14:05 - 14:15	**Tour de table on motivation and expectations of participants from REFOCUS CoP**
14:15 - 14:25	**Warm-up / Ice breaker** (e.g. share an object)
14:25 - 14:30	**Group arrangement**
14:30 - 14:50	**Launch of key ideas, narrative of the CoP** ● POSSIBLE QUESTIONS: ● Potential incidence in teaching / your organisation - what can be changed (FOR TEACHERS/ORGANISATIONS) ● … (FOR STUDENTS) ● Good practices related to sustainability ● (Brainstorming about REFOCUS module)
14:50 - 14:55	**Wrap-up** ● TOPICS FOR FUTURE CoPs
14:55 - 15:00	**Closing remarks**

Table 42 Participants session #1 TU Delft CoP

#	Stakeholder	Target stakeholders
1	FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Educator
2	JP_Professor from Delft University of Technology_ Maritime operations and managements	Educator
3	MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 18-22 y.o
4	JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 22-25 y.o
5	Moderator 1 CambiaMO	
6	Moderator 2 CambiaMO	
7	Moderator 3 Andaira	

I.Contents of today's meeting

Moderator 1:

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- *The idea is to raise awareness of the environmental and climate change impact on transport, shipping, and logistics. Then, we need to understand the notion of climate-related issues and determine which strategies can be implemented to fight against climate change. Additionally, we need to consider our role in bringing two different aspects to this Conference of Parties (CoP). The first aspect is related to what companies and the business world are currently seeking in terms of skills from students, as well as what NGOs are looking for in the new generation coming from universities.*
- *We will try to achieve the key objective of engaging a design thinking approach to develop a future-oriented curriculum. It is known, and I guess you are aware, that a significant portion of emissions, about one-third, is produced by the transport sector, including both logistics and passenger transportation. However, it's not just emissions that pose a challenge; the materials used for batteries and other components are also critical. In the world we live in, there are many complex issues, even in the shipping sector.*
- *For instance, the emissions in the ocean are highly concerning as they have a profound impact on the survival of marine life and the overall health of our oceans. That's why your participation and contribution to this process are truly important.*
- *It's worth mentioning that our involvement extends beyond this particular aspect. We are also engaged in climate empowerment and action planning, which have undergone several years of negotiations at the United Nations and country levels.*
- *So, uh, Jasper and Mees, we would like to understand a little bit about your aspirations and your perspective on sustainability. First of all, we would like to know why you chose to be here, and if it's not out of obligation. I don't think so. But, uh, let me explain further.*
- *We are also interested in learning about your ambitions regarding training and what you would like to know more about climate change, sustainability, and the work that needs to be done. As engineering students, you will eventually graduate from university and likely be involved in defining sustainable infrastructure. We hope that you will be fortunate enough to have the opportunity to contribute in this area.*
- *It's important to define sustainable-oriented infrastructure, but we understand that you may not have all the answers at this point. That's why we are curious to know what you expect from your training and education.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *For me, as a student, **I have a strong desire to incorporate sustainability into my education**. It's a topic that holds great importance and will become even **more critical in the future**. Regardless of the specific field of engineering I pursue, I understand that sustainability will play a significant role in my work and interactions.*
- *Personally, I find online education to be a fascinating concept. I have taken several online courses, most of them from TU Delft, and have greatly benefited from the flexibility and accessibility they offer. It was exciting when I was approached to develop an online course **focused on sustainable transportation**, as it perfectly aligned with the topic of my thesis.*
- *Speaking of my thesis, I am currently working on analyzing the energy consumption of ports. This research not only contributes to my academic pursuits but also ties into the broader theme of sustainable transportation. It's an area that I am truly passionate about and eager to explore further.*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I wasn't directly involved, but the faculty was still working on shaping the curriculum vision for maritime technology. This presented opportunities to include more sustainability and relevant topics into the study program.*
- *Although I didn't have much influence this year, it was interesting to learn about the vision of TU Delft and the broader international perspective on relevant issues. Personally, **I would like to see more focus on sustainability in transport and shipping education.***
- *As individuals, we are encouraged to be more sustainable, but I believe **that companies have a significant role to play** in making a meaningful impact. As future engineers, we will likely be working in these companies, developing technologies that can either contribute to or prevent pollution. It would be fascinating to explore how companies, in a broader sense, can tackle pollution and identify the crucial areas for sustainability.*

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- *While propulsion is often highlighted in discussions on marine technology, I doubt it is the sole solution to achieving sustainable maritime practices. There are undoubtedly other important aspects to consider.*

Moderator (regarding what MR said):

- *I find the point about the technology side of maritime engineering intriguing, especially in relation to the discussions around engineering and ocean exploitation mentioned in Bonus Beef 58.*
- *I'm not sure if there is more information available on this topic, but I'm curious if anyone here has better knowledge or understanding. If any of you have taken engineering courses, it would be great to hear your insights.*
- *Regarding sustainability and climate change, what specific discussions or topics are covered in these courses? This question is open to everyone, including Run and Frederick.*
- *Perhaps Maria can provide some input on this as well. It seems like an area where we may have limited knowledge, particularly for those not directly involved in the field of study.*
- *If anyone would like to explore how to raise awareness and gain a better understanding of technology that is climate change-friendly versus technology that is not, I'm interested in hearing your thoughts.*
- *Furthermore, I'm curious if the university has any initiatives or approaches in place to promote these changes. It's possible that the private sector plays a significant role in driving such advancements, as you mentioned earlier.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *I believe that the issue of climate change is quite complex.* ***It's not just about the technology; it also needs to make economic sense.***
- *Yes, there are various aspects to consider. It's not just a matter of finding technological solutions. People* ***need to be convinced and there's a psychological element involved.***
- *Exactly, it goes beyond engineering. There are social, psychological, and economic factors at play.As an engineer, my inclination is often to focus on what works and how to implement it. However, I recognize that* ***addressing climate change requires more than just technical solutions.***
- *I try to convey to my students that even with legislation in place, it may not be effective if the underlying assumptions are flawed. We need more data and a comprehensive approach. It's an interesting and challenging endeavor, but one that we must embrace.*

Moderator (in response to what JP just said):

- *When you work with your students, what advice do you give them? What kind of information do you provide?*
- *Even in engineering, I mean, it's because, of course, maybe they're looking for well-funded work, even though finding work is quite easy now. And, but then, we don't really have a shortage of workers. Uh, they're quite qualified workers. What advice can you give them for adopting technology in a sustainable way? Because it's not something we have a recipe for at any level, but it's really a challenge.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *So, I think there are two things that I emphasize. First, it's important* ***to take action early on****, even if it's just a small pilot project. Doing something, even if it lasts throughout the lifetime, is more effective than doing nothing. If you wait 20 years to act, it will be too late.*
- *Secondly, I try to show the importance of considering the bigger picture. While a certain fuel might be the most desired for vessels from their perspective,* ***it may not be the best option if the supply is not available or if it's too expensive.*** *We need* ***to consider the overall impact and feasibility****. For example, ammonia is a potentially good fuel option, but it is also toxic. So,* ***how do we deal with this dilemma?*** *We need specialized training for handling ammonia, especially if a large portion of the fleet starts using it.*
- *It's worth noting that there haven't been any accidents involving ammonia carriers so far, but that's because only a small percentage of the fleet uses them. If the entire fleet were to adopt ammonia as a fuel, the likelihood of accidents would increase.*

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FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I think what's important about sustainability is **that there's a mindset shift.** When we traditionally look at transportation, it's often about costs and maybe service level. And then, since maybe 15 years, there's also research incorporating a little bit of reduction here and there, which is always easy to get. I think it's very important to really design research and also education around **the targets that we need to achieve the climate targets.** And that often means that we have to do very different work and, in our problems, it could mean that there's a drive system that changes and suddenly I have a completely different logistics of the system as a result.*
- *And I think that's the mindset that we need to sort of transfer in education, and that's very important because of course, it's nice to have a little bit of greenwashing here and greenwashing there and we say, "Okay, they can make things a little better here and a little better there," but that doesn't get us where we need to go. And so that is very important and that is, I think, in most domains not really happening.*
    - ***To build realistic models and achieve decarbonized transportation, it is crucial to involve expertise from a diverse range of individuals. This includes organizing discussions among people with different backgrounds, addressing governance aspects,** and seeking input from the University of Engineering regarding machine design and transportation system organization. Collaboration is necessary for success.*

Moderator 1:

- *Do you see that you can change your curriculum in your new activity? For example, you can include this aspect about the dilemma. I think it's something that your colleague from Ambers also mentioned, but from a different framework.*
- *I meant that you didn't express it as clearly as you did just now. I mean, it's like, okay, I understand that I need to investigate that, but I'm afraid of disrupting the environment and the other aspect.*
- *But do you think there's room in the curriculum for that? Is it something that can be done at the university level, in a professor's course, or on a national scale?*

FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *But what we have done recently is for a course in which we use case studies, we have implemented decarbonization objectives for all of them.*
- *And then, in a similar way, we could also focus on potential dilemmas and try to model that. If you have some agent-based approach in the back of that, it's a good tool to represent different attitudes and conflicts that might occur.*
- *So technically, that's possible if you're in charge, of course. It's also relatively easy to change that.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *In the Netherlands, our education process differs from that of America, where detailed course prescriptions are provided by ABET. We undergo regular audits **to ensure quality and have our learning goals evaluated by experts and government representatives.** Although changing final qualifications is challenging, we have more flexibility with individual course learning goals. We recently completed a curriculum vision for the Bachelor's program, adding learning goals that emphasize safety and sustainability. These important aspects can be addressed within a short timeframe during courses. We are actively implementing and highlighting these changes.*

Moderator 1:

- *So it's important to incorporate a perspective on sustainable development into each course. This can include referencing SD (sustainable development) and addressing dilemmas that arise. The objective is to increase access to information and raise public awareness about ongoing debates. I particularly enjoyed an article on ethical aspects from your field.*
- *Could we delve deeper into these ethical aspects? I'm curious, do you have any insights? What range do these ethical aspects cover? Are we discussing ethical aspects related to waste management, human rights, or climate change? Are they interconnected in any way?*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

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- *In the Bachelor's program,* ***there is a dedicated course on ethics called "Ethics and Engineering."****I believe that's the name or something similar. The course focuses on important aspects and problematic issues related to engineering.*
- *Specifically, I remember discussions about self-driving cars and automation, including the societal impact of engineering and the ethical considerations, such as job displacement. Safety and ethics are also emphasized, with examples given of engineers who failed to address safety issues due to being silenced by their superiors, leading to harm.*
- *The course delves into how to handle such situations and the importance of standing up for ethical principles in engineering.That's what I recall about the ethical aspect that was covered in our education.*
- *I also remember following a course from a different department. We spoke about different types of transportation, and then we made some simple back-of-the-envelope calculations. We considered the current fuel type and explored the implications of switching to another type.*
- *We discussed the additional costs involved and the safety concerns related to ammonia leakage, as we mentioned earlier. After considering all the options,* ***we provided pros and cons for most of them.***
- *We also discussed the potential of hydrogen as a sustainable fuel, but acknowledged that it has its own issues*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *As the Commissioner of Education, I act on behalf of the majority of students, including the students' union in some capacity. There was a course where guest turbines were initially covered, but they were replaced with fuel cells, which is more relevant in today's world. I really appreciated this change. I believe that students appreciate it as well, although they may not actively push for it. The lectures need to be quite outdated before students start to complain, but* ***it's important to include modern subjects****. So, in that sense, there wasn't much pressure from fellow students. However, it's important to acknowledge that students truly appreciate it when such changes are made.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *If I look back a couple of years, around 8 to 10 years ago,* ***there wasn't a significant amount of research funding for sustainability.*** *However, even at that time, I encountered two or three students out of the average ten* ***I interacted with each year who were specifically interested in sustainability. Although this didn't result in immediate changes to education, it did influence the focus and information I provided. As a result, I became more involved in sustainability research and gained further insights.***
- *Over time, research funding for sustainability increased, and its impact trickled down to lower-level classes. However, there wasn't a clear shift in that direction initially. It was more pronounced among students who had a clearer idea of their goals and aspirations,* ***typically at a more advanced stage of education.***
- *Conversely, in Bachelor's programs, many students were primarily focused on survival and passing their current courses, rather than considering broader sustainability perspectives.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *That's what I often hear from students around me as well. They consider sustainability in their career choices and plans for the future, even after they graduate. It gives them a sense of purpose, and if they already know they want* ***to pursue sustainability-related work after graduation****, it allows them to take logical steps towards that goal.* ***They also try to incorporate sustainability into their master's theses or the courses they take.***
- *It's important to continuously seek and apply new knowledge, especially in rapidly evolving fields like sustainability. This way,* ***you can share with industry professionals what you have learned and help them become aware of emerging concepts and practices.***

Moderator (in response to JS):

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- *Do you feel that you can be a promoter of certain content within your company that is not already sought after? It's not necessarily that the company is actively seeking specific skills, but rather you have the ability to provide additional content because they may not be aware of it. Of course, this may vary depending on your specific circumstances.*
- *Could you provide a concrete example or any anecdote related to this situation?*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

First, I was thinking that you are because you graduated, especially in the maritime industry.

- *I don't think within the industry there's a lot of push to go sustainable, so it should come from outside, from people who just graduated and see the importance and want to change something or contribute something to that.*
- *Because I think most companies don't, they are currently looking into how they can become more sustainable. But it's not like they already have the knowledge, so if you just start working, it's not like you can learn from somebody who's already working in the industry.*
- *You have to figure that out along the way yourself.*

FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *To give an example of what you've mentioned and something that I've seen in the industry for years is that **sustainability is often considered costly. Business objectives usually take priority, and if there's anything left, then maybe some sustainability initiatives are implemented for appearance's sake.***
- *If you come from the university and learn about the opportunities that come with sustainable development, such as focusing on climate targets and transitioning to different fuel types, etc., **you can bring these ideas into companies and say, 'Look, this is a different approach, and we actually have a lot of opportunities.***
- *By investigating future technologies now, we can also discover business opportunities by introducing these ideas to companies, especially in the merchant sector, which is often somewhat conservative.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *If you try to educate about the maritime industry, it should also clearly explain the added cost of switching to sustainable **alternatives and the opportunity costs associated with it.***
- *What are potential ways to reduce costs? Because if you don't do anything and stick with outdated technology, there will be additional costs. It's not in line with regulations, which can lead to extra taxes or penalties. You can also consider the potential changes in policies in the future.*
- *By not switching, you may face additional expenses, and it might be better to be proactive and align with industry expectations.*

Moderator (in response to what FS & JS said):

- *I think your role in the Netherlands, being a country on the frontline of the sea, is crucial in addressing adaptation and sustainability. As an engineering student, you can bring this message into your courses and advocate for the importance of considering adaptation aspects in the face of future challenges. The research and policy focus on sustainability in the coming years can provide an opportunity for you to push the system and create positive change.*
- *One aspect to address is the perception of adaptation as a cost rather than an investment. It is essential to emphasize the value of adaptation in cost-benefit analyses. Although adaptation is complex and involves uncertainties, it is necessary **to consider other aspects beyond just costs**. The Netherlands has played a significant role in developing cost-benefit analysis methodologies, and it's important to continue pushing for a broader understanding of its benefits and implications.*

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MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I can understand that most students may not see much room for incorporating newer and yet to be discovered technologies in their education.* ***Many sustainable solutions are still underdeveloped and require further research and concrete data.*** *This lack of tangible information makes it challenging to lecture or provide detailed information on these topics. However, an interesting discussion took place with a representative from the Dutch shipbuilding industry, focusing on the preservation of shipbuilding knowledge in the Netherlands and the future of the industry. It was concluded that the Netherlands is more of a knowledge-based nation in the maritime industry, rather than solely a shipbuilding nation.*
- *It is crucial for students to realize that the existing shipbuilding knowledge may become outdated and no longer contribute to maintaining our top position in the maritime industry. This* ***understanding can prompt them to explore and embrace new technologies that will drive innovation and sustainability.***

Moderator:

Is technology the sole solution for addressing the challenges we face, or do we need something else?

- *It's an open debate. Should we focus on pushing for technology that is climate change-friendly, or should* ***we push for a broader change? In order to learn how to make a difference, it may not always be solely technology-oriented. There is value in studying and understanding other aspects beyond technology.***

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

I would argue that the focus should not be solely on technology.

- *Instead,* ***the focus should be on regulation. By implementing regulations, we can create financial incentives for transitioning to sustainable alternatives.*** *Once there is a prospect of these incentives, there will be a significant increase in interest and investment in the technological development of these new solutions.* ***The financial motivation becomes a driving force for technological advancements.*** *Therefore, while technological development may take time, the crucial first step is to establish effective regulations that make it worthwhile to develop and adopt sustainable technologies.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *We are currently working with a research agency to explore ways* ***to attract more students to marine technology programs,*** *rather than opting for mechanical engineering within the same faculty.*
- *Jeroen Pruijn: As part of this effort, the agency conducted interviews with approximately 20 students, including those who were in the process of making their educational choices or had recently made them. They attended our open days and had conversations with the students to gather insights. One interesting finding was that many of these students, regardless of whether they intended to pursue a maritime career,* ***expressed a strong interest in contributing to technological solutions for sustainability.***
- *While their primary focus may not be sustainability itself, they see sustainability as a technological challenge that needs to be addressed. This indicates that students are attracted to the concept of using technology to solve sustainability-related issues.*

FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- Regarding that aspect, we are actively collaborating with researchers in Leiden, particularly focusing on *environmental aspects. This collaboration helps us address the environmental challenges in the maritime industry.*
- *I also agree with Jasper's point about incentives. I****t's crucial to have technology-agnostic incentives that promote the development of new technologies.*** *Instead of investing all the resources into a single solution that may not prove effective in the end, we should encourage continuous technological development.*
- *Furthermore,* ***behavioral aspects play a significant role in this context.*** *The idea of endless growth and consumption poses challenges even with the best technology available. Therefore,* ***addressing behavioral patterns and promoting sustainable practices are essential elements to consider.***

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Moderator 1 (closure):
Even though we have made progress without the involvement of the private sector and NGOs, I think we have learned a lot. Perhaps in the future, if we can engage with them, we may be able to go even further. However, I believe that our team has shown great flexibility, and we can continue with the resources we currently have. Nevertheless, it is always important to have an external perspective.

Actions

#	Date	Description	Person/institution in charge
1	27 June 16pm	2nd session	

Session n#2

2nd session
27 June 2023
16:00-17:00 (EEST)

Table 43 Agenda_session #2 TU Delft CoP

Hour	Activity
16:00 - 16:02	**Welcome to the REFOCUS Community of Practice #2 | 2 min**
16:02 - 16:10	**Sharing the main topics from CoP#1 (Padlet) | 8 min**
16:10 - 16:40	**Developing focused contributions on these topics (Padlet) | 30 min**
16:40 - 16:55	**Discussion on best teaching practices and needs, existing programs (content, duration, location, fees, etc.) | 15 min**
16:55 - 17:00	**Wrap-up and next steps | 5 min**

Table 44 Participants session #2 TU Delft

#	Stakeholder	Target stakeholders
1	FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Educator

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2	JP_Professor from Delft University of Technology_ Maritime operations and managements	Educator
3	MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 18-22 y.o
4	JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 22-25 y.o
5	Moderator 1 CambiaMO	
6	Moderator 2 Andaira	

Moderator 1:

- *Once you have worked individually, we will have some time for an open discussion altogether to further develop these contributions.*
- *In this part, we would like to explore these ideas from the perspective of education and from your individual viewpoints.*
- *As students, researchers, or professors, it is important for us, as a Community of Practice, to contribute ideas that align with future-oriented goals. These ideas should provide relevant content. As soon as we move forward, we will discuss the next steps to take.*

Moderator 1:

- *So, I can briefly explain the three main topics we have identified. From your discussions, we observed the importance of incorporating sustainability into education, engineering practices, and programs. You mentioned that sustainability is already present to some extent, but there is a need to further develop and enhance its relevance.*
- *So, I noticed a strong desire and interest from students in developing technological solutions for sustainability. They expressed their eagerness to pursue this during their academic and professional lives. However, they also mentioned that their interest could wane if companies do not actively support or engage in sustainability practices. Therefore, we also recognized the importance of companies acknowledging the relevance of sustainability.*
- *You also mentioned the possibility of introducing sustainability ideas to companies so that they understand their significant role in driving meaningful change.*
- *So, in terms of civil society, the university, and the labor market, we want to show how you can contribute and add new topics. We invite you to work on this and choose a color that corresponds to the perspective you represent today. If you are a student, please pick the light blue color that represents civil society. If you are a professor or researcher, please choose the color representing the university. By using different colors to add ideas, it will help us better understand and categorize the contributions.*

From this point, moderator gives 8-10 minutes to work on the paddlet

- feedback obtained from the activity in the paddlet:

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

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- *So I wrote this down, and the narrative usually is, "Is that OK? We have a... Currently, we have our existing system." Uh, then we have these challenges to solve for it to become green, and one of them is, as you mentioned already, there's an additional cost, but what's often not included, I cannot name a lot of them from the top of my head, but I'm pretty sure they do exist. With this transition, like the current system, people always forget which flows it has because it's working. But there are improvements to be made that the energy transition could give to the current system. Debts should also be thought of or highlighted more**. It's not only about accepting this additional cost because we want to be green. No, there's also an additional opportunity** that comes from switching that we didn't have before, and we should really think about what those opportunities could be in the transportation and logistics sector.*

Moderator 1:

- *So, do you think it's something that could be integrated with the ring in the development of this technology, thinking that, umm, it was going outside of education whenever students are working on projects? So, do you think it's?*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I would say it's more about the technical practices. I was referring to engineering practices.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *It's like the other way around, where there is an issue in the current system, and if you solve it, it can also contribute to sustainability. So, if you address that issue, it might also have a positive impact on sustainability.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *Actually, that's the case a lot of the time. The same goes for my master project. The main objective **is to increase efficiency, which indirectly leads to using less energy, making it more sustainable**. So, it's not always about additional costs to become sustainable; many times, it actually reduces costs because we improve efficiency, which in turn is more sustainable.*

Moderator 1:

- *From the post below, it was mentioned that students should focus not only on optimizing costs and meeting customer demands but also on sustainability. I believe it aligns with what you mentioned earlier. Yeah, it's about making sustainability more visible in projects and establishing a connection with other goals so that they can be aligned. It's not just a concern for the future or an additional cost.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I'm not sure who wrote this, but when I read about the cost, I immediately think of something called external cost. It refers to quantifying all those external factors that you don't directly pay for but still impact your operations. If you include these factors in your optimization process, you take into consideration the true cost of the energy you use, including **its environmental and societal impacts.** So, it's not just about the immediate financial cost, but also considering the broader implications and externalities.*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *It was my comment on optimizing cost, **meeting customer demands**, and sustainability. However, I meant it in a slightly different way, more in a fundamental sense. Nowadays, many of the projects I work on are focused on designing the most sustainable solution while also meeting customer demands and being as cost-effective and efficient as possible. But I also believe it would be really interesting for **students to incorporate a balance between these three aspects. Considering functionality, not just environmental costs, but also the regular operational costs and overall sustainability.***

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Moderator 1:

- *And I also found it interesting. It demonstrates how the direct impact on cost influences design choices made by students or engineers. If we were to unlock this information for developers, how do you envision showcasing the hidden impact of their choices?*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *That was also my comment, and it elaborated on the previous comments. It emphasized the importance of not just focusing on the reduction, but also on how certain choices can increase efficiency and directly impact the environment. There are CO2 or emission reports available for* ***many engineering projects, and it would be interesting for students to see how their engineering choices directly influence the environment or sustainability aspects of what they are designing.*** *It's about quantifying and showcasing the actual impact they are making, not just as individuals, but through their designs.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *What I was thinking is that the initial focus should be on ensuring that students are aware of the broader context of climate change. Understanding climate change and its mechanisms is typically covered in biology or related subjects. So, it's more about exploring the impact their decisions have within their specific fields of study. They should consider alternatives and identify areas where they can make a difference in transportation and logistics in relation to climate change. Another important aspect is to highlight to students* ***that addressing sustainability challenges goes beyond technical solutions.*** *It also involves policy changes that will shape the future of these solutions. Designing something that works perfectly based on current policies may not be sufficient, as policies can change over time. For example, if designing a ship now that will operate for the next 30-40 years, it's crucial to anticipate and incorporate potential policy changes related to climate change. Therefore, it's essential to have an understanding of existing and future policies and think ahead in the design process. This can include considering modular designs to accommodate future policy changes or even surpassing the emission standards demanded by policies. By anticipating future policies and taking them into account, students can make more sustainable and forward-thinking design choices.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology (in response to Jeroen):

- *Additionally, I believe it's important to acknowledge that* ***the field of sustainability is still evolving, and there is ongoing research and discussion surrounding it****. As a researcher myself, I understand that there is still much to learn and teach in this area. One aspect that I bring up is the complexity of policy implementation and its trade-offs. Sustainability is not a straightforward concept, and policies implemented today may have unintended consequences or require sacrifices in certain areas. It's crucial to become aware of the choices we have and the challenges we face in achieving sustainability. For example, we recently discussed the construction of a Hydro DEM, where building it higher would increase its power output but also lead to the destruction of natural habitats. These discussions raise ethical considerations, and there may not always be a definitive right answer. However, it's important to engage in these discussions and consider the broader implications rather than solely relying on measurable metrics.* ***Sustainability is a multifaceted issue that requires thoughtful and critical thinking beyond simple measurements.***

Moderator:

- *All I'm seeing in the discussion is that you're getting very interested.*
- *I also noticed the relevance of international collaboration in the context of technology design and development. When designing and developing technologies, it is crucial to consider their applicability in different contexts and countries, rather than limiting them to a specific location. Therefore, it's important to emphasize the significance of global perspectives and inclusivity in the design and development process. This approach should not only be limited to documentation but should also be considered during implementation. The goal is to ensure effective and efficient utilization of the technologies in various*

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locations. Additionally, international collaborations play a vital role in knowledge exchange and learning from different perspectives.

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *The newest thing that exists is the recognition that future engineering solutions will need to meet specific restrictions due to climate-related reasons. It's no longer just about com the field of sustainability is still evolving, and there is ongoing research and discussion surrounding itparing new solutions to existing ones and determining which is better. Instead,* ***the focus is on identifying the optimal solution within the given restrictions****. Therefore, it is crucial to educate the new generation of engineers about these future restrictions and teach them how to design solutions that align with those constraints. These restrictions are likely to be influenced by policy decisions. By understanding and incorporating these restrictions into their designs, the new generation of engineers can create solutions that are best suited for the future.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Collaboration in engineering has been limited to our own group, lacking diversity and interdisciplinary involvement. To enhance collaboration, we need to expand our partnerships to include individuals from different fields, educational levels, and cultural backgrounds. By embracing diverse perspectives, we can generate a wider range of ideas and prevent tunnel vision. Engaging with people outside our immediate circle fosters innovation and ensures inclusive designs.* ***It is crucial to go beyond our*** **comfort zones and collaborate with a variety of stakeholders to create the best solutions.**

Image Appendix 8 Padlet TU Delft CoP

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Actions

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#	Date	Description	Person/institution in charge
1	18 July 13.30	3rd session	

Session n#3

3rd session
18 July 2023
13:30-14:30 (EEST)

Table 45 Agenda_ session #3 TU Delft CoP

Hour	Activity
13:30 - 13:32	**Welcome to the REFOCUS Community of Practice #3 | 2 min**
13:32 - 13:37	**Sharing the main outcomes from CoP#2 | 5 min**
13:37 - 14:27	**Developing specific proposal on future-oriented curriculum | 50 min**
14:27 - 14:30	**Wrap-up and next steps | 5 min**

Table 46 Participants session #3 TU Delft CoP

#	Stakeholder	Target stakeholders
1	FS_Assistant Professor from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Educator
2	JP_Professor from Delft University of Technology_ Maritime operations and managements	Educator
3	MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 18-22 y.o
4	JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology	Student 22-25 y.o
5	Moderator 1 CambiaMO	
6	Moderator 2 CambiaMO	

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Moderator 1:

- In reference to the futured oriented curriculum: *developing each thematic unit, they can indeed be developed not together during the discussions. Some possible methods that could be used have also been discussed, and these come from the previous discussion. For example, it was already mentioned to include other pictures.*
- *To meet the need for collaboration, it is certainly important to use collaborative methods and critical thinking during the design process. These are the parts and this is the Padlet where this is posted. So, here is the link to the idea that was shared previously.*
- *Once the contents are understood, the details can be defined. So, don't think you're done with this. There is an overview, and then the details can be discussed.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Mees and I have backgrounds in maritime. So, we are more focused on maritime technology and mechanical engineering. If I look at the objectives, we have...*
- *Mees and I are much more aligned with the subject of **enabling climate neutral, clean, smart, and competitive waterborne transport than with collaboration strategies between stakeholders in the transport and logistics industry data sharing**. That is the subject that we as individuals need to develop further. So, if the focus is on one subject, there will be a difference in my answer compared to being part of the subject.*
- *That's just the beginning. When I look at the maritime aspect, I can see that it is covered in the Bachelor's program from the first year, so by the third year, it is easily understood. However, when we consider the **more complex collaboration strategies**, students need to have more diverse backgrounds. That's something that should be addressed at **the master's level**.*

Moderator 1*:* reads the thematic units Nº1:

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *Actually, I would say this is for bachelor's students because it involves back-of-the-envelope calculations, which are very important when you start studying engineering. It's essential to do some simple calculations and be able to understand how different things compare to each other.*
- *And, of course, you still need to do these calculations later on in your career or during your master's degree as well. **But starting with simple calculations, making these assumptions and seeing what happens, is something you should begin with right away.***

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *It can be part of what you learn during your bachelor's degree, especially in the field of mechanical engineering. You learn about engine combinations, energy drive systems, and similar topics. This is just to show that the same calculation can be used for alternative fuels to demonstrate their impact on exhaust and other aspects. These kinds of examples can be easily added to make it interesting for students to see.*
- *By using these examples, students can realize that what **they are learning is not limited to a specific type of engine,** such as a digital engine. The basics they learn can be applied to different types of engines, whether it's a pneumatic engine or a metal engine, for instance.*

Moderator 1:

- *So the first point is about the calculation and estimation of energy efficiency in a system.*
- *And then, to implement and transform this into a use case, it could be applied to various sectors such as logistics, maritime, or other industries.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Yes, but what we are currently discussing is more related to mechanical systems and their efficiencies. As soon as we shift our focus to a logistical system, which can also be optimized, we start considering*

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factors such as the time vehicles spend waiting and traveling empty, rather than just looking at the engine itself. When we delve into these aspects, it becomes a topic suitable for a master's degree.

Moderator 1:

- *So maybe we can say that we start with the bachelor's degree, as it's good to begin at the beginning and cover topics such as energy-efficient system presentations and estimations, as Jasper mentioned. This provides a foundation.*
- *In terms of emissions and related aspects, such as Suite 2 emissions, maybe we can address them in a different context. When we continue thinking about the same team but focus on all the logistics factors for maritime or other industries, it could be better suited for the master's degree.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *If I could try to rephrase that a bit, what I heard and I also agree with is that in order to make comparisons, which was mentioned earlier, you can easily do the simple calculations and comparisons between different technologies at the bachelor's level. However, when you start looking at the impact on the overall system, especially in terms of logistics, it becomes more complex.* ***This involves analyzing specific use cases and performing logistical calculations.***
- *In the beginning, you start with the concept of a blank sheet, comparing different ideas and technologies. Then, as you progress, you explore the implementation of these ideas and how they affect the system. This level of analysis is typically done at the master's level.*

Moderator 1:

- *Okay, so in the first point, we can target both bachelor's students and master's students.*
  I think the impacts and comparison of use cases always revolve around energy efficiency, and then we transition to other aspects, right?

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Yes, if you want to make it completely clear, you can indicate that BSc is associated with mechanical systems, and MSc is associated with logistics.*

Moderator 1: reads point 2:

- *This is more related to economic, environmental, and societal impacts, and the Netherlands is known for excelling in these areas. So, I suppose that also applies here.*
- *In the context of climate change, there is a growing trend towards a holistic approach, where we consider not only the impacts in a specific location but also the activities and processes involved. For instance, it includes reflecting on the extraction of materials, such as lithium in Chile, and considering the consequences for local communities. This broader perspective is important to understand the wider implications. If we want to delve deeper into these considerations, it's worth exploring whether such aspects are already incorporated in the analysis.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *It seems that these considerations are not explicitly covered in the fixed programs of mechanical or maritime engineering. However, there are elective courses available for students to explore these topics if they choose to do so. Colleagues working in other faculties, such as TBM, provide insights into life cycle assessments and similar areas. Additionally, there is a master's program in industrial ecology that covers these aspects. While the availability of these courses and programs exists, it's not certain how many students will choose to pursue them. It may be that the focus tends to be more on technical solutions towards sustainability rather than the broader considerations.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

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- *It seems that supply chain analysis, specifically in the context of maritime or engineering courses, is not typically taught as part of the curriculum. Instead, it is something that students may choose to explore if they pursue studies in TPM (Technology, Policy, and Management) or a related field. While there may be individuals who have an interest* ***in analyzing the life cycle emissions of the maritime industry, they would likely pursue further studies at the master's level.***
- *It's worth noting that* ***not knowing about supply chain analysis is different from actively teaching it. There is a question of whether it should be extensively taught as part of the curriculum****.*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *Yes, I do believe that there is some discussion of* ***supply chain analysis in certain second-year courses in the maritime program.*** *Specifically, in courses like "Maritime Markets and Operations," there may be treatment of economic aspects such as the lifetime or life cycle assessment over a span of 30 years. However, it seems that the focus on environmental and societal impacts is largely absent. While there is some analysis early on in the study, there is a clear gap when it comes to considering the environmental and societal aspects.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *If you look at this, and based on what we were just discussing, it reminds me of something that would be covered in a design course. I'm not sure how many design courses are still included in the mechanical engineering program, but there are typically quite a few. In these courses, there is a growing recognition that the world is changing, and designers should consider not only the technical specifications from the client but also* ***the impact their designs have and the choices they make****.* ***It's important to not solely focus on technological suitability but also take into account the broader impact and operation of the design.***
- *However, implementing this on a broader scale might be challenging due to the already busy and full curriculum of the courses. So, while there is potential to incorporate these considerations, it may be more difficult to do so extensively.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *And in the end,* ***safety is usually a priority, but there are also cost and environmental aspects to consider.*** *I recall there being a matrix where you fill in your group's discussion on what is more important, sustainability or safety.* ***Safety always takes the highest priority, but the implications of incorporating environmental considerations into the design are not thoroughly explored.***
- *For example, we might think, "Oh, we should take environmental considerations into account in our design. This design scores higher in terms of environmental impact compared to the other one." However, the depth of analysis on these implications may be lacking.*
- *To delve into these considerations further, it would be beneficial to provide* ***more details during the design project and evaluate different designs against each other using multi-criteria analysis methods****. It's important not to simply state that we care about environmental costs or safety; we need to specifically address what aspects are considered unsafe and how we can address them.*
- *Regarding environmental implications,* ***we should clarify whether we are referring to emissions from the source or the environmental impact during operations****. Are there ways we can modify the design to mitigate these impacts?*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- ***Quantifying impacts is important, but currently, we primarily address them qualitatively in the bachelor's program****. However, there is room to incorporate more of it in the design project.*
- *If we want to approach it quantitatively, it will align with what I initially mentioned about the integrated transport or logistics course. That course would be a suitable place to develop the skills for quantitative analysis. However, to truly quantify the benefits of integrated logistics, it would likely require a master's*

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level of study. The bachelor's program provides the foundation upon which these quantitative analyses can be built.

Moderator 1:

- *I'm wondering if it depends on what we aim for. Specifically, for both bachelor's and master's students, is it possible to integrate these considerations into the existing courses?*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *For the bachelor's program, approximately 90% of the desired integration is already present in the new curriculum. While the courses are still being developed, any additional contributions can be considered and utilized by lecturers. They may selectively incorporate relevant aspects into their teachings. This collaborative approach allows for a more comprehensive and well-rounded educational experience.*
- *Regarding the master's program, there are plans to develop a specific course, as suggested by Frederick. This course can be offered as an elective for interested students or made mandatory for those specializing in machine engineering or related fields.*

***Moderator 1:** about point 3-4:

- *Yes, I think it would be great if we could meet and discuss cases like this today. Regarding the course for engineering students, I'm not sure about your thoughts on it, Mees. As for understanding and anticipating existing and future policies, I believe it is crucial to incorporate this aspect into the curriculum. This includes considering the complexity of policy implementation and the legal framework. It's also important to address topics such as legal aspects and human rights. Are there any existing courses in European curricula that cover these subjects?*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Certainly, we do cover some aspects of **legislation and regulations in the design courses**. Additionally, I teach a master's course that delves into **maritime law and related subjects**. In these design courses, we also consider the International Maritime Organization (IMO) and their emission reduction targets. Just recently, they updated their targets, moving the 2050 goals to 2040 and aiming for zero emissions by 2050. This update has significant implications for ship design, as the ships being designed now will still be in operation by 2050. However, it is yet to be determined whether all ships must be zero-emission or if there will be some intermediate solutions. As you can see, there are ample topics for discussion and exploration in the current context.*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I agree that it is essential to consider all possibilities and calculate various scenarios in ship design. However, it's important to acknowledge the inherent contradiction between efficiency and incorporating space for future zero-emission engines. Designing ships with extra empty space for potential future modifications may seem contradictory to efficiency principles.*
- *This aspect should be taught to students, but it may be more suitable for later stages of their education when they have acquired the necessary background knowledge to make informed predictions. It is crucial to understand the implications and make decisions based on factors such as the feasibility and cost-effectiveness of retrofitting a ship for zero emissions compared to the option of scrapping it and replacing it with a new vessel.*
- ***Incorporating discussions on these decision-making processes and understanding the implications of predictions in ship design** should be implemented in relevant projects or courses.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *Yes, I believe that the master course offered, which focuses on more complex design in engineering, can definitely play a significant role in addressing these topics. Additionally, I am currently engaged in research with four PhD students who are directly exploring these questions. However, it is important to note that we do not yet have all the answers, as these are complex and evolving areas of study.*

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JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *What I understand is that you had a course where you had **to identify different policies and propose solutions for each scenario.** For example, the case study might involve achieving fully renewable electricity production in a country, and you had to come up with three scenarios with different policies and determine the design implications for each scenario.*
- *In a similar vein, you suggest considering different **regulatory changes and exploring how they would impact the designs.** By analyzing the variations in design requirements, you can identify common elements that can be implemented across different scenarios, facilitating easier adaptation to changes.*
- *This approach allows for a comprehensive examination of different policy and regulatory contexts and enables the exploration of design alternatives and their implications in each scenario.*

MR_Graduate student from from Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *I understand the perspective that delving into complex policy analysis and design implications may require a deeper level of background knowledge and insight that is typically acquired at the bachelor level. It may be more appropriate to introduce these topics in advanced courses at the master's level or in specialized programs where students have already gained a strong foundation in relevant systems and concepts.*
- *Considering the complexity and depth of understanding necessary to make informed predictions and decisions, it may be more suitable to focus on building a solid knowledge base in the bachelor's program and then exploring these advanced topics in later stages of education.*

Moderator 1:

- *You bring up a valid point about the value of interdisciplinary education and how it can enhance the understanding of complex issues such as climate change and human rights. Just as economics students are encouraged to take courses in the humanities to broaden their perspectives, it is indeed possible for engineering students to have opportunities to explore related topics beyond their technical curriculum.*
- *Integrating aspects of sustainability, societal impacts, and ethical considerations into engineering education can help students develop a holistic understanding of their technological decisions and their effects on people and communities. While the in-depth analysis and prediction of final scenarios may be more suitable for advanced stages of education, introducing the concept of considering impacts and fostering a broader awareness of social and environmental implications can be valuable at the bachelor's level.*
- *By incorporating interdisciplinary courses or electives that touch upon these subjects, engineering students can gain a more comprehensive understanding of the consequences and responsibilities associated with their work and contribute to sustainable and socially conscious engineering practices.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *I understand your perspective regarding the challenges of incorporating additional subjects into the regular bachelor's curriculum. It requires careful consideration and allocation of resources to ensure that all educational goals are met effectively. **Integrating sustainability, societal impacts, and ethical considerations can indeed be time-consuming and demanding.***
- *One possible approach could be to offer these topics as part of **a minor study**. **A minor typically allows students to explore a specific area of interest in greater depth, dedicating a portion of their credits to specialized courses**. By creating a minor focused on **interdisciplinary aspects,** students could have the opportunity to develop the necessary tools and skills to address sustainability and societal impacts within their field.*
- *There have been ongoing discussions about the structure of minors, with suggestions for providing students with more flexibility in their course choices. Offering a range of courses that align with the goals you mentioned would enable students to select from a predetermined set of options, fostering integration and a broader understanding of these critical issues.*

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Moderator 1: talking specifically about point 4 (thematic units)

- Incorporating climate change knowledge and sustainability concepts can be done at all educational *levels, from bachelor's to PhD courses. It is important for universities to integrate these topics throughout the curriculum to attract students with a passion for climate change. The approach can involve dedicated courses or integrating the themes across various subjects. The decision depends on the university's goals and available resources. Ultimately, the aim is to equip students with the knowledge and skills to address climate change and contribute to sustainability in their respective fields.*

JS_Master student from the Delft University of Technology_ Transport Engineering and Logistics, Maritime and Transport Technology:

- *In my bachelor's, and I also think in maritime studies, there is no interdisciplinary aspect at all. You typically take courses with people from the same program. Most minors are within the same discipline. However, there may be some space for interdisciplinary exploration.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- ***In the master's program, there is an option to take an interdisciplinary project as an elective course. This project focuses on sustainability-related issues from companies,*** *so students have the opportunity to work on scenarios related to sustainability. However, this course is not mandatory.*
- *Furthermore, there are ongoing efforts to develop an interdisciplinary course in collaboration with Durham University of Applied Sciences and trade schools.* ***The goal is to bring together different levels of education to solve maritime issues.*** *This course would involve discussions and perspectives from various stakeholders, including welders, operators, designers, and innovators.*
- *One example of a potential case study is the conversion of the monumental fleet, which includes wooden sailing ships and old steam ships.* ***Ethical considerations and discussions about transitioning to less polluting systems would be part of the course.***

Moderator 1:

- *Perhaps we can explore the possibility of involving NGOs in the interdisciplinary approach. In the Netherlands, there are strong partnerships between universities and NGOs that actively participate in conferences and negotiations, such as the Conference of Parties and the Paris Agreement. Some NGOs focus on climate justice and gender issues. It would be interesting to consider if there could be collaboration with these organizations to bring their advocacy perspectives into engineering education.*
- *While there may be more contact with private sectors, such as ship makers, car makers, infrastructure developers, and service providers, there is potential to inject advocacy and perspectives from NGOs into the engineering field. This could create a broader understanding of the societal and environmental implications of engineering decisions and foster a more holistic approach to sustainable development.*

JP_Professor from Delft University of Technology_ Maritime operations and managements:

- *In my master's course, I used* ***to invite a representative from an NGO focused on ship recycling to provide insights into their work****, the reasons behind their opposition to certain practices, and the current situation in the industry. However, due to scheduling difficulties and changes in personnel, it became challenging to continue that arrangement. Nonetheless, I believe there are still possibilities to* ***incorporate NGO perspectives****, if, we can find individuals who can contribute technically and foster meaningful discussions without resorting to binary judgments of right or wrong. The goal would be to create a space for a nuanced and constructive understanding of different viewpoints.*

Table 47 Future-oriented curriculum TU Delft CoP

TITLE	**Future-oriented curriculum on sustainability and climate resilience for transport, shipping and logistics**

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OBJECTIVE	Integrate interdisciplinary knowledge for climate-neutral waterborne transport and collaboration strategies, tailored for bachelor's and master's programs.
TYPE	
DURATION	
TARGET	Bachelor's and master's students in maritime technology and mechanical engineering, with introductory content at the bachelor's level and more advanced topics (e.g.: analyzing specific use cases and performing logistical calculations) at the master's level. Minor study to explore a specific area of interest in greater depth, dedicating a portion of their credits to specialized courses. *By creating a minor focused on interdisciplinary aspects, students could have the opportunity to develop the necessary tools and skills to address sustainability and societal impacts within their field.*
DESCRIPTION	**Main aspects to cover:** **1. Highlighting opportunities of the energy transition, energy efficiency improvements leading to sustainability improvements** **2. Quantifying impacts and balancing functionality (customer demands), efficiency, effectiveness** **3. Understanding / anticipating existing and future policies and thinking ahead in the design process, handling complexity in policy implementation (Policy and legal framework)** **4. Incorporating climate change knowledge and the concept of sustainability, embracing an interdisciplinary approach**
THEMATIC UNITS	**1. Highlighting opportunities of the energy transition, energy efficiency improvements leading to sustainability improvements** Additional opportunities that come from switching to more energy-efficient systems, thinking about what those opportunities could be in the transportation and logistics sector. Calculations and use cases comparison (from mechanical systems (BSC) to logistics (MSC)). *Target: bachelor students, master students* **2. Quantifying impacts and balancing functionality (customer demands), efficiency, effectiveness** Economic, environmental and societal impacts, not just about the immediate financial cost, but also considering the broader implications and externalities. Considering functionality (customer technical specifications), not just environmental costs, but also the regular operational costs and overall sustainability. Life-cycle assessment. Supply chain analysis. Multi-criteria analysis. Applied in design projects. IPCC, IPBES reports. Using examples of past events (e.g. wrong choices leading to inequalities and other impacts). *Target: bachelor students, master students (quantified)* **3. Understanding / anticipating existing and future policies and thinking ahead in the design process, handling complexity in policy implementation (Policy and legal framework)** Essential to have an understanding of existing and future policies and think ahead in the design process. Decision-making based on different scenarios and projections. *Target: master students* **4. Incorporating climate change knowledge and the concept of sustainability, embracing an interdisciplinary approach** Understanding climate change and its mechanisms is typically covered in biology or related subjects. The field of sustainability is still evolving, and there is ongoing research and discussion surrounding it. Case studies. *Target: bachelor, master students (interdisciplinary project), PhD* **Incorporating environmental considerations into the ship design**

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METHODS	Interdisciplinary courses: there are ongoing efforts to develop an interdisciplinary course in collaboration with Durham University of Applied Sciences and trade schools. The goal is to bring together different levels of education to solve maritime issues. Guest speakers (e.g.: invite representative from an NGO focused on ship recycling to provide insights into their work)

Actions

#	Date	Description	Person/institution in charge
1	September	Final transnational session CoP4	

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